DUPLICATE AVAILABLE FOR LOAN

National Meteorological
Library & Archive
London Road
Bracknell RG12 2SZ

# UK METEOROLOGICAL OFFICE
# GLOBAL DATA MONITORING REPORT

January 2003

**Data Assimilation**
**Meteorological Office**
**London Rd**
**Bracknell**
**Berkshire**
**RG12 2SZ**

This report has not been published. Permission to quote from it should be obtained from the Head of Data Assimilation

ORGS UKMO U

**National Meteorological Library**
FitzRoy Road, Exeter, Devon. EX1 3PB

Distribution List

| | |
|---|---|
| Mr B Sumner | NMC, Victoria, Australia |
| Dr S. C. Chou | CPTEC/INPE, Brazil |
| Dr V Wagner | Deutscher Wetterdienst,<br>Hamburg, Germany |
| Ms C Nelson | NMC, Washington, USA |
| Mr H Benichou | SCEM METEO-FRANCE. |
| Mr E A Meindl | National Data Buoy Centre,<br>Stennis Space Center, USA |
| Mr G Verner | Canadian Meteorological Centre,<br>Quebec, Canada |
| Dr R Pauley | Fleet NumericalMETOC Center,<br>Moneterey |
| Permanent Rep. with WMO | Moscow, Russia |
| Hydrometcentre of the Russian Federation | Moscow, Russia |
| Mr Yukinari Ohta | JMA, Tokyo, Japan |
| Mr Francois Lalaurette | Head, Meteorological Operations Section,<br>ECMWF, Reading, UK |
| Dr M J Uddstrom | Met. Service, Wellington,<br>New Zealand |
| Mr R W Lunnon | Met. Office, Bracknell, UK |
| Dr B Macpherson | Met. Office, Bracknell, UK |
| Mr B Oatway | Met. Office, Bracknell, UK |
| Mr C A Parrett | Met. Office, Bracknell, UK |
| National Meteorological Library | Met. Office, Bracknell, UK |

## CONTENTS

1. Introduction

2. Global Data Monitoring Statistics

3. Composite Observing Systems for the North Atlantic (COSNA)

...oooOOOooo...

## 1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

Dr. B. Macpherson
Mesoscale Data Assimilation and Observational Monitoring
Meteorological Office
London Road
Bracknell
Berkshire
United Kingdom
RG12 2SZ

## 2 Global Data Monitoring Statistics

### Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

### Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

### Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m $s^{-1}$ have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m $s^{-1}$ have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

| Figure | Parameter |
|---|---|
| 4 | Mean wind vectors |
| 5 | Mean observation - background wind vector |
| 6 | Mean observation-background speed (m $s^{-1}$) |
| 7 | RMS observation-background vector (m $s^{-1}$) |

**Radiosonde Observations**

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

**Satellite Observations**

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

| Figure | Parameter Plotted | Layer (hPa) |
|---|---|---|
| 10 | Availability/average daily number | 701-1000 |
| 11 | Vector mean wind (observed) | 701-1000 |
| 12 | Observation-background vector wind difference | 701-1000 |
| 13 | Mean observation-background speed differences | 701-1000 |
| 14 | RMS observation-background vector difference | 701-1000 |
| 15 | Availability/average daily number | 401-700 |
| 16 | Vector mean wind (observed) | 401-700 |
| 17 | Observation-background vector wind difference | 401-700 |
| 18 | Mean observation-background speed differences | 401-700 |
| 19 | RMS observation-background vector difference | 401-700 |
| 20 | Availability/average daily number | 101-400 |
| 21 | Vector mean wind (observed) | 101-400 |
| 22 | Observation-background vector wind difference | 101-400 |
| 23 | Mean observation-background speed differences | 101-400 |
| 24 | RMS observation-background vector difference | 101-400 |

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

| Figure | | Weighting function peak (hPa) |
|---|---|---|
| 26 | Mean | Surface (HIRS8) |
| 27 | SD | Surface (HIRS8) |
| 28 | Mean | 700 (HIRS15) |
| 29 | SD | 700 (HIRS15) |
| 30 | Mean | 500-700 (HIRS11) |
| 31 | SD | 500-700 (HIRS11) |
| 32 | Mean | 400 (HIRS4) |
| 33 | SD | 400 (HIRS4) |
| 34 | Mean | 700 (AMSUA5) |
| 35 | SD | 700 (AMSUA5) |
| 36 | Mean | 300 (AMSUA7) |
| 37 | SD | 300 (AMSUA7) |
| 38 | Mean | 100 (AMSUA9) |
| 39 | RMS | 100 (AMSUA9) |

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

| Figure | | Weighting function peak (hPa) |
|---|---|---|
| 41 | Mean | Surface (HIRS8) |
| 42 | SD | Surface (HIRS8) |
| 43 | Mean | 700 (HIRS15) |
| 44 | SD | 700 (HIRS15) |
| 45 | Mean | 500-700 (HIRS11) |
| 46 | SD | 500-700 (HIRS11) |
| 47 | Mean | 400 (HIRS4) |
| 48 | SD | 400 (HIRS4) |
| 49 | Mean | 700 (AMSUA5) |
| 50 | SD | 700 (AMSUA5) |
| 51 | Mean | 300 (AMSUA7) |
| 52 | SD | 300 (AMSUA7) |
| 53 | Mean | 100 (AMSUA9) |
| 54 | RMS | 100 (AMSUA9) |

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

| Figure | | Weighting function peak (hPa) |
|---|---|---|
| 56 | Mean | Surface (HIRS8) |
| 57 | SD | Surface (HIRS8) |
| 58 | Mean | 700 (HIRS15) |
| 59 | SD | 700 (HIRS15) |
| 60 | Mean | 500-700 (HIRS11) |
| 61 | SD | 500-700 (HIRS11) |
| 62 | Mean | 400 (HIRS4) |
| 63 | SD | 400 (HIRS4) |
| 64 | Mean | 700 (AMSUA5) |
| 65 | SD | 700 (AMSUA5) |
| 66 | Mean | 300 (AMSUA7) |
| 67 | SD | 300 (AMSUA7) |
| 68 | Mean | 100 (AMSUA9) |
| 69 | RMS | 100 (AMSUA9) |

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

## 3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics (**Geopotential Height and Windspeed at 100 and 500 hPa**) for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

**Revisions**

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

# TABLE 1

# MONITORING OF MARINE SURFACE OBSERVATIONS
# MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
# MONITORING CENTRE: BRACKNELL
# MONTH: January 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for ships, fixed buoys and platforms.

**Standard of comparison** :Background field from UKMO global model.

**Observation times** :All hours

**Elements monitored**
:Mean sea level pressure (hPa).
:Wind speed (m $s^{-1}$).
:Wind direction (Degrees).
:Sea surface temperature (Degrees).

**Parameters monitored**

:NOBS :Number of observations received excluding duplicates.

:PGE :Percentage of observations with gross errors.

:%REJ :Percentage of observations flagged excluding those with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
**N.B. a positive bias indicates the wind observation is veered to the background.**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors.

**GROSS ERROR LIMIT**
:15 hPa (pressure)
:25 m $s^{-1}$ (vector wind)
:10 degrees (sea surface temperature)

**SELECTION CRITERIA** :NOBS ≥ 20 , and one or more of the following:

1.|bias|
≥ 4 hPa (pressure),
≥ 5 m $s^{-1}$ (wind speed),
≥ 30 degrees (direction).
≥ 3 degrees (sea surface temperature).

2.SD
≥ 6 hPa (pressure),
≥ 80 degrees (direction).
≥ 5 degrees (sea surface temperature).

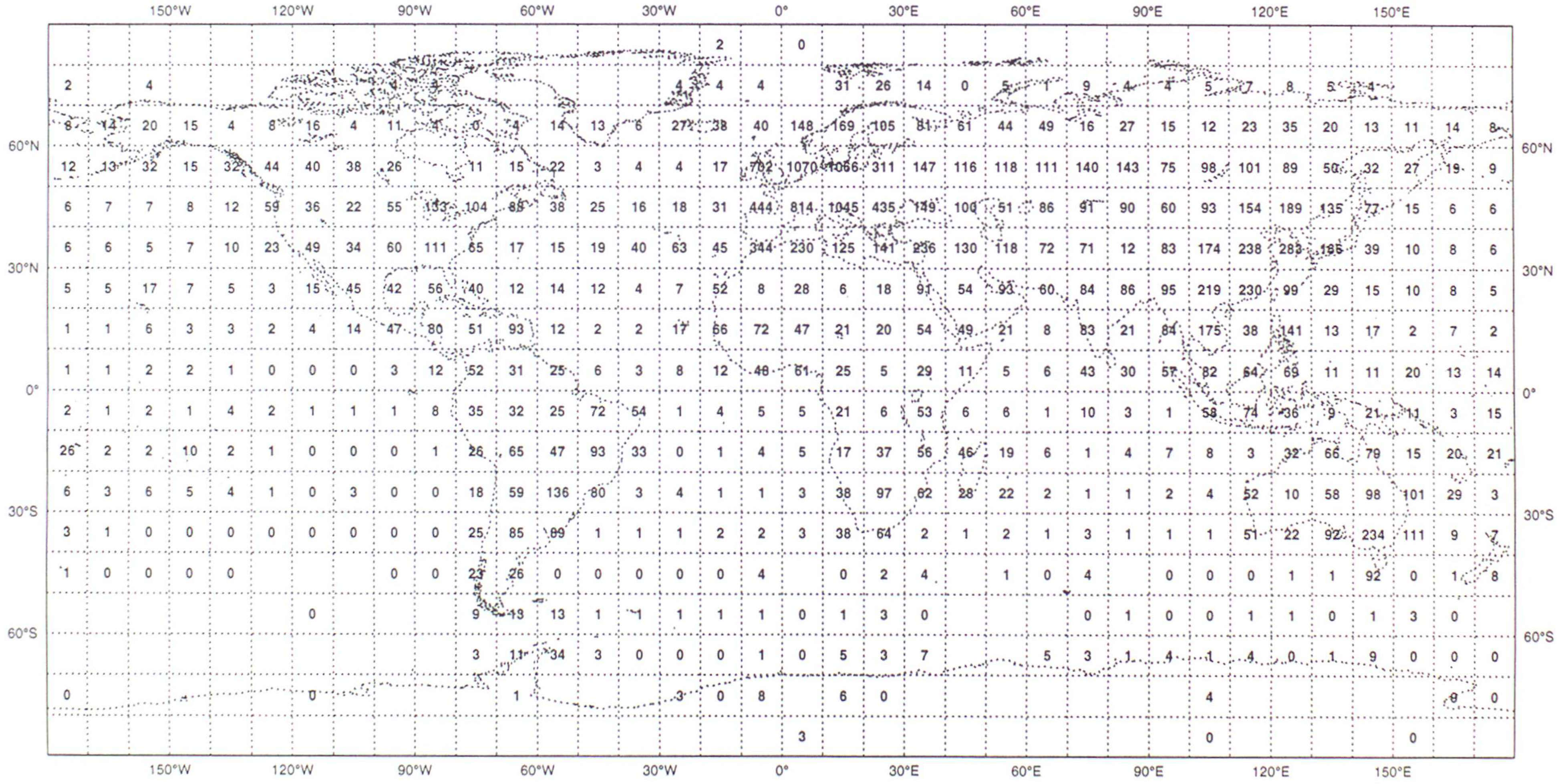
3.PGE ≥ 25

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | |
| C6KD6 | P | 52 | 0 | 0 | 1.2 | 4.1 | 4.3 |
| C6QK | P | 34 | 0 | 100 | 2.2 | 5.4 | 5.8 |
| ELWR3 | P | 44 | 0 | 34 | 1.1 | -4.3 | 4.5 |
| KMJL | P | 40 | 0 | 40 | 1.0 | -4.3 | 4.4 |
| LAOL5 | P | 33 | 0 | 0 | 1.4 | 5.1 | 5.3 |
| LMWO3 | P | 32 | 0 | 22 | 1.1 | -4.2 | 4.3 |
| OYJS2 | P | 20 | 0 | 75 | 3.1 | 5.8 | 6.6 |
| PHKL | P | 60 | 0 | 90 | 1.3 | 4.2 | 4.4 |
| P3NG5 | P | 26 | 0 | 31 | 0.6 | 4.2 | 4.3 |
| P3YS5 | P | 76 | 0 | 3 | 1.8 | 4.3 | 4.6 |
| UFEQ | P | 20 | 45 | 100 | 3.2 | -5.2 | 6.1 |
| UHLE | P | 52 | 0 | 37 | 1.9 | -7.9 | 8.1 |
| VJT6198 | P | 42 | 0 | 64 | 3.7 | -6.4 | 7.4 |
| V2AZ5 | P | 29 | 0 | 72 | 4.2 | 7.5 | 8.6 |
| WE4879 | P | 47 | 2 | 74 | 1.5 | -4.5 | 4.8 |
| XPYM | P | 79 | 1 | 6 | 2.0 | 4.6 | 5.0 |
| 3FOC5 | P | 22 | 0 | 14 | 1.0 | 6.5 | 6.6 |
| 31057 | P | 1360 | 16 | 76 | 4.0 | 6.5 | 7.6 |
| 48092 | P | 231 | 77 | 98 | 7.4 | -4.6 | 8.7 |
| 62114 | P | 48 | 0 | 100 | 3.9 | 8.2 | 9.1 |
| 62301 | P | 710 | 27 | 100 | 7.4 | -1.3 | 7.5 |
| WIND SPEED | | | | | | | |
| A8AM7 | SPEED | 46 | 0 | 74 | 3.0 | 11.4 | 11.8 |
| BBXX KS0 | SPEED | 409 | 0 | 100 | 2.0 | -5.4 | 5.7 |
| C6FM5 | SPEED | 20 | 0 | 100 | 3.1 | 5.0 | 5.9 |
| C6RO2 | SPEED | 22 | 0 | 5 | 2.9 | -6.5 | 7.1 |
| DLCX | SPEED | 34 | 0 | 21 | 5.2 | 7.3 | 9.0 |
| ELYD5 | SPEED | 27 | 4 | 100 | 4.3 | 6.2 | 7.5 |
| ELZN6 | SPEED | 47 | 0 | 19 | 3.8 | 5.4 | 6.6 |
| GBRP | SPEED | 26 | 0 | 8 | 3.7 | 6.0 | 7.0 |
| HP6038 | SPEED | 212 | 0 | 3 | 3.7 | 5.5 | 6.7 |
| KDBG | SPEED | 28 | 4 | 29 | 4.4 | 5.1 | 6.8 |
| KS000 | SPEED | 134 | 0 | 100 | 2.1 | -6.0 | 6.3 |
| KS004 | SPEED | 170 | 0 | 100 | 1.9 | -5.2 | 5.5 |
| KS014 | SPEED | 121 | 0 | 100 | 2.3 | -5.2 | 5.7 |
| KS025 | SPEED | 176 | 0 | 100 | 1.9 | -5.6 | 6.0 |
| OZQS2 | SPEED | 55 | 2 | 100 | 6.7 | 11.4 | 13.2 |
| PBVO | SPEED | 21 | 0 | 0 | 3.2 | -6.4 | 7.2 |
| PDVN | SPEED | 27 | 0 | 19 | 4.6 | 6.8 | 8.2 |
| SHIPBM | SPEED | 24 | 0 | 38 | 5.3 | 8.6 | 10.1 |
| TSMS | SPEED | 34 | 0 | 6 | 4.2 | 5.2 | 6.7 |
| UAST | SPEED | 91 | 0 | 10 | 2.9 | 5.4 | 6.1 |
| UCJI | SPEED | 27 | 0 | 0 | 3.3 | 5.5 | 6.4 |
| UHOM | SPEED | 46 | 0 | 9 | 3.2 | 5.0 | 6.0 |
| VEP717 | SPEED | 75 | 0 | 8 | 4.4 | 6.7 | 8.0 |
| VMAL | SPEED | 30 | 0 | 3 | 2.9 | 5.2 | 5.9 |
| VNSZ | SPEED | 167 | 0 | 5 | 4.0 | 5.0 | 6.4 |
| VRWF2 | SPEED | 36 | 0 | 17 | 5.0 | 5.4 | 7.4 |
| VVKK | SPEED | 23 | 0 | 100 | 3.1 | 6.6 | 7.3 |
| VVTN | SPEED | 41 | 0 | 20 | 2.7 | 6.9 | 7.4 |
| V2AQ3 | SPEED | 25 | 0 | 72 | 6.3 | 5.8 | 8.6 |
| 3ETX6 | SPEED | 83 | 0 | 100 | 3.8 | 5.6 | 6.8 |
| 3FEI6 | SPEED | 22 | 0 | 14 | 3.2 | 5.7 | 6.5 |
| 3FJA9 | SPEED | 27 | 0 | 19 | 6.1 | 5.8 | 8.4 |
| 3FZM7 | SPEED | 56 | 0 | 0 | 3.3 | -5.2 | 6.1 |
| 44142 | SPEED | 64 | 0 | 23 | 4.4 | -9.7 | 10.7 |
| 44145 | SPEED | 134 | 0 | 5 | 4.4 | 5.4 | 7.0 |
| 62303 | SPEED | 735 | 0 | 2 | 3.5 | -5.3 | 6.4 |
| 9MBW7 | SPEED | 34 | 3 | 62 | 5.5 | 8.8 | 10.4 |
| 9MET6 | SPEED | 25 | 16 | 56 | 6.4 | 10.2 | 12.1 |

| IDENTIFIER | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|
| WIND DIRECTION | | | | | | | |
| ELAC5 | DIRN. | 65 | 0 | 0 | 48.5 | -36.5 | 60.7 |
| MSJZ8 | DIRN. | 20 | 0 | 0 | 69.2 | -51.1 | 86.1 |
| PCHF | DIRN. | 23 | 17 | 0 | 138.7 | 14.9 | 139.5 |
| VCLM | DIRN. | 71 | 0 | 0 | 113.8 | -9.4 | 114.2 |
| 23101 | DIRN. | 30 | 0 | 0 | 28.4 | -71.6 | 77.0 |
| 23102 | DIRN. | 22 | 0 | 0 | 67.7 | ***** | 155.5 |
| 3FRO4 | DIRN. | 23 | 0 | 0 | 76.1 | 41.1 | 86.5 |
| 52006 | DIRN. | 77 | 0 | 0 | 57.9 | 37.6 | 69.1 |
| 62131 | DIRN. | 77 | 0 | 0 | 12.9 | 31.8 | 34.3 |
| SEA SURFACE TEMPERATURE | | | | | | | |
| CGDS | SST | 214 | 62 | 100 | 0.2 | -0.5 | 0.5 |
| CG2960 | SST | 222 | 30 | 54 | 2.0 | -0.1 | 2.0 |
| C6MS4 | SST | 41 | 0 | 100 | 1.1 | -3.5 | 3.7 |
| C6YW | SST | 32 | 0 | 88 | 1.7 | -5.2 | 5.4 |
| DBBC | SST | 710 | 38 | 78 | 0.8 | 0.9 | 1.2 |
| DBBI | SST | 506 | 36 | 56 | 0.6 | -0.2 | 0.6 |
| DBBX | SST | 687 | 67 | 100 | 0.8 | 0.3 | 0.8 |
| DGNB | SST | 597 | 38 | 39 | 1.8 | 0.3 | 1.8 |
| DGNG | SST | 20 | 25 | 80 | 4.2 | -6.4 | 7.7 |
| DICP | SST | 670 | 60 | 60 | 0.8 | 0.0 | 0.9 |
| EIQN | SST | 682 | 47 | 100 | 0.8 | -0.9 | 1.2 |
| ELKU8 | SST | 24 | 0 | 100 | 0.7 | 3.3 | 3.4 |
| ELTS6 | SST | 68 | 1 | 100 | 1.0 | 6.8 | 6.9 |
| ELXO4 | SST | 22 | 0 | 100 | 0.9 | -3.1 | 3.3 |
| ELYE8 | SST | 66 | 0 | 100 | 0.7 | 3.3 | 3.3 |
| FNJI | SST | 138 | 0 | 100 | 0.6 | 3.0 | 3.1 |
| H3QA | SST | 21 | 0 | 100 | 1.1 | -4.2 | 4.3 |
| H9RS | SST | 48 | 0 | 100 | 2.9 | 5.0 | 5.8 |
| JKHH | SST | 78 | 0 | 100 | 2.2 | 5.4 | 5.8 |
| KRPB | SST | 84 | 0 | 100 | 1.6 | -3.1 | 3.5 |
| KS010 | SST | 30 | 0 | 20 | 0.8 | -3.2 | 3.3 |
| LACF5 | SST | 24 | 0 | 100 | 1.5 | 4.3 | 4.6 |
| LF3F | SST | 123 | 51 | 51 | 0.4 | 0.1 | 0.4 |
| PDYX | SST | 40 | 0 | 88 | 1.0 | -3.8 | 3.9 |
| PHSG | SST | 30 | 0 | 33 | 1.0 | -3.4 | 3.6 |
| SIWB | SST | 27 | 0 | 67 | 1.4 | 4.6 | 4.8 |
| S6IH | SST | 24 | 0 | 100 | 0.6 | 7.0 | 7.0 |
| UAST | SST | 83 | 0 | 35 | 1.7 | -3.4 | 3.8 |
| UCJI | SST | 31 | 0 | 100 | 2.7 | -3.1 | 4.1 |
| UCOL | SST | 71 | 4 | 100 | 0.9 | -3.6 | 3.7 |
| UCPE | SST | 22 | 0 | 45 | 1.9 | -3.3 | 3.8 |
| UFHG | SST | 28 | 0 | 71 | 3.1 | -4.5 | 5.4 |
| VCLM | SST | 180 | 37 | 100 | 1.8 | 1.2 | 2.2 |
| VGLZ | SST | 23 | 100 | 100 | | | |
| VOCJ | SST | 181 | 0 | 100 | 1.3 | 5.5 | 5.7 |
| V2AQ3 | SST | 34 | 0 | 82 | 2.0 | -3.4 | 3.9 |
| V7DP7 | SST | 41 | 2 | 80 | 1.4 | -4.1 | 4.3 |
| WCW9126 | SST | 72 | 85 | 94 | 1.5 | -1.8 | 2.3 |
| WCY6777 | SST | 28 | 0 | 25 | 1.9 | -3.1 | 3.6 |
| WTDO | SST | 95 | 0 | 49 | 3.0 | -3.4 | 4.6 |
| WWU8 | SST | 20 | 100 | 100 | | | |
| YJQL3 | SST | 64 | 0 | 61 | 1.7 | -3.8 | 4.2 |
| ZCBH3 | SST | 40 | 27 | 35 | 2.3 | 1.5 | 2.8 |
| ZMFR | SST | 156 | 100 | 100 | | | |
| 3FMM6 | SST | 44 | 18 | 100 | 0.5 | -4.0 | 4.0 |
| 41008 | SST | 719 | 0 | 100 | 0.7 | -4.9 | 5.0 |
| 42007 | SST | 719 | 0 | 96 | 0.7 | -3.5 | 3.6 |
| 42021 | SST | 510 | 0 | 99 | 0.6 | -4.7 | 4.7 |
| 44137 | SST | 653 | 1 | 100 | 3.1 | 5.9 | 6.7 |
| 46131 | SST | 716 | 100 | 100 | | | |
| 46146 | SST | 630 | 100 | 100 | | | |
| 46181 | SST | 718 | 100 | 100 | | | |
| 9VVN | SST | 31 | 39 | 94 | 2.9 | -6.8 | 7.4 |

Figure 1. SHIP/SYNOP mean daily count. JANUARY 2003
All hours
Global average number of observations in 24 hours = 20874


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2 0
2 4 4 4 4 4 4 31 26 14 0 5 1 9 4 4 5 7 8 5 4
8 14 20 15 4 8 16 4 11 4 0 4 14 13 6 27 38 40 148 169 105 81 61 44 49 16 27 15 12 23 35 20 13 11 14 8
12 13 32 15 32 44 40 38 26 11 15 22 3 4 4 17 702 1070 1066 311 147 116 118 111 140 143 75 98 101 89 50 32 27 19 9
6 7 7 8 12 59 36 22 55 133 104 88 38 25 16 18 31 444 814 1045 435 149 100 51 86 91 90 60 93 154 189 135 77 15 6 6
6 6 5 7 10 23 49 34 60 111 65 17 15 19 40 63 45 344 230 125 141 236 130 118 72 71 12 83 174 238 283 186 39 10 8 6
5 5 17 7 5 3 15 45 42 56 40 12 14 12 4 7 52 8 28 6 18 91 54 93 60 84 86 95 219 230 99 29 15 10 8 5
1 1 6 3 3 2 4 14 47 80 51 93 12 2 2 17 66 72 47 21 20 54 49 21 8 83 21 84 175 38 141 13 17 2 7 2
1 1 2 2 1 0 0 0 3 12 52 31 25 6 3 8 12 48 61 25 5 29 11 5 6 43 30 57 82 64 69 11 11 20 13 14
2 1 2 1 4 2 1 1 1 8 35 32 25 72 54 1 4 5 5 21 6 53 6 6 1 10 3 1 58 74 36 9 21 11 3 15
26 2 2 10 2 1 0 0 0 1 26 65 47 93 33 0 1 4 5 17 37 56 46 19 6 1 4 7 8 3 32 66 79 15 20 21
6 3 6 5 4 1 0 3 0 0 18 59 136 80 3 4 1 1 3 38 97 62 28 22 2 1 1 2 4 52 10 58 98 101 29 3
3 1 0 0 0 0 0 0 0 0 25 85 89 1 1 1 2 2 3 38 64 2 1 2 1 3 1 1 1 51 22 92 234 111 9 7
1 0 0 0 0 0 0 23 26 0 0 0 0 0 4 0 2 4 1 0 4 0 0 0 1 1 92 0 1 8
0 9 13 13 1 1 1 1 1 0 1 3 0 0 1 0 0 1 1 0 1 3 0
3 11 34 3 0 0 0 1 0 5 3 7 5 3 1 4 1 4 0 1 9 0 0 0
0 0 1 3 0 8 6 0 4 8 0
3 0 0

## TABLE 2

## MONITORING OF MARINE SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - DRIFTING BUOYS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

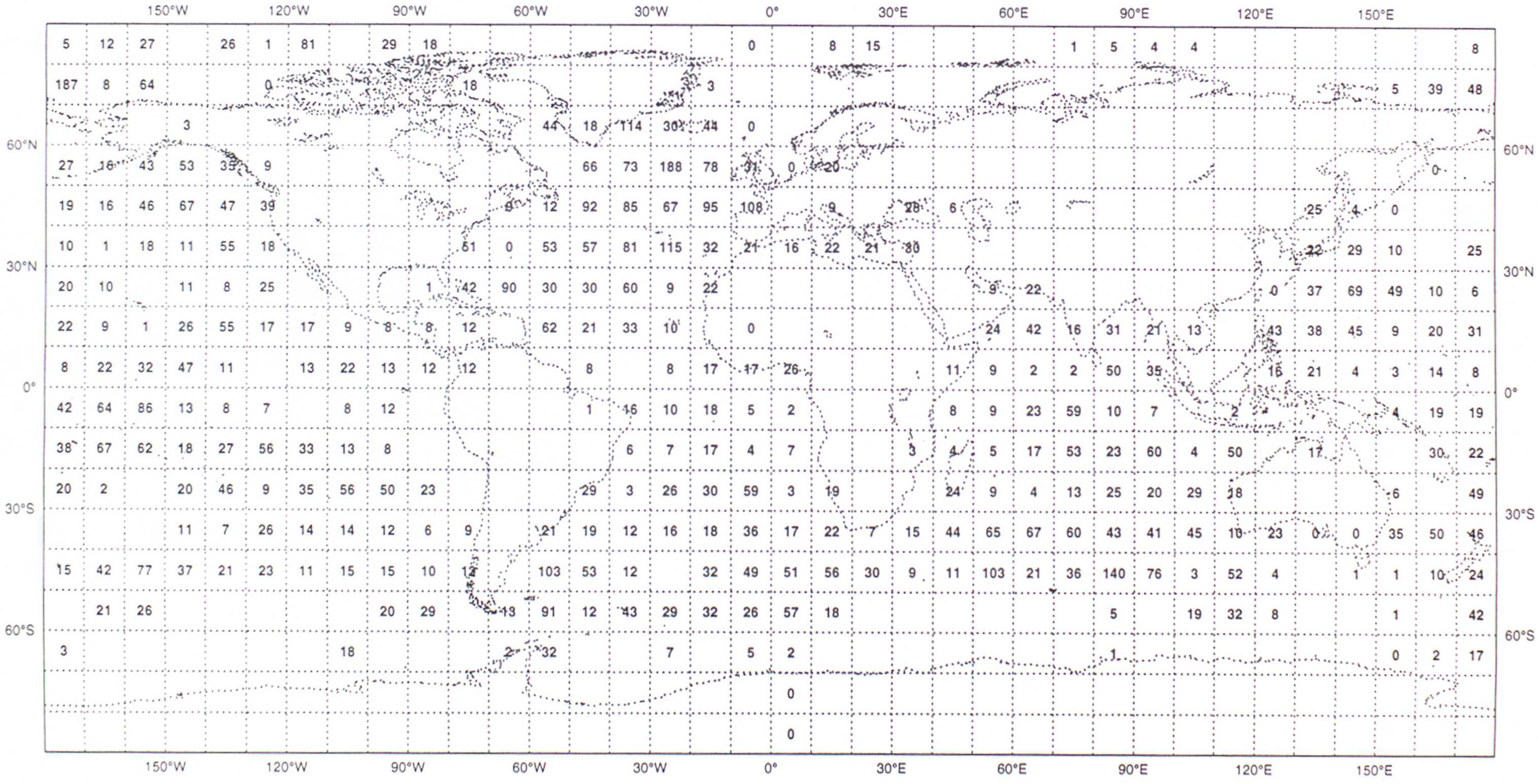
| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for drifting buoys. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | : All hours |
| **Elements monitored** | | :Mean sea level pressure (hPa).<br>:Wind speed (m $s^{-1}$).<br>:Wind direction (degrees).<br>:Sea surface temperature (degrees). |
| **Parameters monitored** | :NOBS | :Number of observations received excluding duplicates. |
| | :PGE | :Percentage of observations with gross errors. |
| | :%REJ | : Percentage of observations flagged excluding those with gross errors |
| | :SD | :SD of difference of observations from background values excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors.<br>**N.B. a positive bias indicates the wind observation is veered to the background.** |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors. |
| **GROSS ERROR LIMIT** | :15 hPa | (pressure) |
| | :25 m $s^{-1}$ | (vector wind) |
| | :10 degrees | (sea surface temperature) |

| | | | |
|---|---|---|---|
| **SELECTION CRITERIA** : | NOBS | ≥ 20 , and one or more of the following: | |
| | 1.\|bias\| | ≥ 4 hPa | (pressure), |
| | | ≥ 5 m $s^{-1}$ | (wind speed), |
| | | ≥ 30 degrees | (direction). |
| | | ≥ 3 degrees | (sea surface temperature). |
| | 2.SD | ≥ 6 hPa | (pressure), |
| | | ≥ 80 degrees | (direction). |
| | | ≥ 5 degrees | (sea surface temperature). |
| | 3.PGE | ≥ 25. | |

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | LAT. | LONG. | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| 15921 | -36.4 | -45.8 | P | 567 | 42 | 91 | 4.0 | 6.1 | 7.3 |
| 17519 | -40.1 | -13.0 | P | 538 | 10 | 57 | 4.3 | 5.4 | 6.9 |
| 23505 | 12.9 | 65.7 | P | 145 | 36 | 69 | 5.9 | 1.2 | 6.0 |
| 23924 | 14.1 | 87.9 | P | 31 | 52 | 58 | 0.6 | -1.9 | 2.0 |
| 61532 | 41.1 | 30.0 | P | 166 | 26 | 100 | 2.3 | 12.4 | 12.7 |
| 71541 | -54.8 | -14.3 | P | 28 | 100 | 100 | | | |
| WIND SPEED | | | | | | | | | |
| 46780 | 56.9 | -170.7 | SPEED | 29 | 21 | 100 | 2.4 | 6.5 | 6.9 |
| 46781 | 55.0 | -177.7 | SPEED | 25 | 0 | 100 | 3.8 | 9.7 | 10.4 |
| 52533 | 31.9 | 174.5 | SPEED | 366 | 0 | 100 | 3.1 | -5.8 | 6.5 |
| 52537 | 30.8 | 137.7 | SPEED | 642 | 0 | 100 | 3.9 | -7.2 | 8.2 |
| 52643 | 34.4 | 144.8 | SPEED | 622 | 0 | 100 | 5.9 | -5.8 | 8.3 |
| WIND DIRECTION | | | | | | | | | |
| 23594 | 17.4 | 87.9 | DIRN. | 59 | 0 | 0 | 13.1 | 99.0 | 99.9 |
| 41648 | 24.9 | -74.6 | DIRN. | 352 | 1 | 0 | 28.8 | 52.6 | 60.0 |
| 46701 | 41.1 | -170.8 | DIRN. | 212 | 0 | 0 | 19.7 | -47.6 | 51.5 |
| 46779 | 58.1 | -142.5 | DIRN. | 123 | 0 | 0 | 25.1 | -38.1 | 45.6 |
| 52643 | 34.4 | 144.8 | DIRN. | 144 | 2 | 0 | 28.6 | -48.2 | 56.0 |
| SEA SURFACE TEMPERATURE | | | | | | | | | |
| 21534 | 41.5 | 140.0 | SST | 135 | 100 | 100 | | | |
| 23968 | 2.6 | 95.5 | SST | 145 | 47 | 83 | 3.7 | -3.0 | 4.7 |
| 31975 | -22.9 | -43.1 | SST | 25 | 0 | 100 | 1.9 | 3.4 | 3.9 |
| 32526 | 2.4 | -90.8 | SST | 209 | 100 | 100 | | | |
| 32538 | 3.8 | -94.7 | SST | 92 | 0 | 98 | 1.4 | -4.3 | 4.6 |
| 32539 | -0.1 | -107.1 | SST | 93 | 99 | 99 | 0.0 | -0.5 | 0.5 |
| 32540 | -1.4 | -103.6 | SST | 93 | 92 | 99 | 3.2 | -8.2 | 8.8 |
| 32907 | 8.5 | -80.1 | SST | 89 | 100 | 100 | | | |
| 32922 | -12.7 | -146.9 | SST | 135 | 5 | 100 | 1.4 | 7.3 | 7.5 |
| 33502 | -28.8 | -12.6 | SST | 108 | 0 | 100 | 0.7 | 4.8 | 4.9 |
| 33514 | -41.7 | -56.3 | SST | 318 | 0 | 64 | 1.2 | -3.2 | 3.5 |
| 41577 | 34.8 | -76.4 | SST | 500 | 52 | 100 | 4.0 | -4.3 | 5.9 |
| 44610 | 41.9 | -45.4 | SST | 1052 | 0 | 82 | 2.3 | -3.8 | 4.4 |
| 46972 | 16.2 | -140.8 | SST | 219 | 0 | 100 | 0.3 | 4.2 | 4.2 |
| 51678 | -13.7 | -172.7 | SST | 80 | 56 | 72 | 3.3 | -0.5 | 3.3 |
| 51757 | -34.6 | 158.2 | SST | 80 | 84 | 97 | 2.5 | -5.1 | 5.7 |
| 51758 | 4.7 | -143.1 | SST | 82 | 0 | 99 | 0.6 | -4.7 | 4.7 |
| 51759 | 0.6 | -149.7 | SST | 78 | 0 | 99 | 0.9 | -7.0 | 7.1 |
| 51760 | -2.7 | -150.2 | SST | 81 | 0 | 98 | 0.6 | -3.5 | 3.5 |
| 51909 | -4.8 | -156.5 | SST | 122 | 98 | 100 | 0.5 | -8.2 | 8.3 |
| 52533 | 31.9 | 174.5 | SST | 362 | 99 | 100 | 0.0 | 9.7 | 9.7 |
| 52536 | 13.4 | 144.8 | SST | 404 | 0 | 100 | 3.2 | -3.3 | 4.6 |
| 55573 | -23.2 | 150.7 | SST | 143 | 30 | 62 | 3.3 | 0.7 | 3.4 |
| 55901 | -16.8 | -179.7 | SST | 60 | 53 | 68 | 3.3 | -0.8 | 3.4 |
| 55905 | -53.6 | -88.5 | SST | 460 | 0 | 100 | 0.2 | 3.0 | 3.1 |
| 61657 | 41.2 | 37.0 | SST | 52 | 0 | 81 | 1.2 | 3.9 | 4.1 |
| 64553 | 64.8 | -27.7 | SST | 53 | 0 | 100 | 0.1 | 4.9 | 4.9 |
| 71570 | -61.2 | -56.1 | SST | 35 | 83 | 83 | 0.0 | -0.4 | 0.4 |
| 71574 | -61.4 | -55.0 | SST | 36 | 83 | 83 | 0.0 | -0.5 | 0.5 |
| 71575 | -61.7 | -56.8 | SST | 36 | 83 | 83 | 0.1 | -0.6 | 0.7 |
| 71577 | -61.7 | -57.9 | SST | 36 | 83 | 83 | 0.1 | -0.7 | 0.7 |
| 71578 | -60.3 | -57.9 | SST | 36 | 83 | 83 | 0.0 | 0.1 | 0.1 |
| 71579 | -62.2 | -59.6 | SST | 31 | 81 | 81 | 0.1 | -1.3 | 1.3 |
| 71603 | -60.1 | -55.3 | SST | 35 | 83 | 83 | 0.0 | 0.7 | 0.7 |
| 71604 | -61.7 | -58.6 | SST | 31 | 81 | 81 | 0.1 | -1.0 | 1.0 |
| 71605 | -62.4 | -60.6 | SST | 36 | 83 | 83 | 0.0 | -0.7 | 0.7 |
| 71606 | -62.5 | -62.1 | SST | 36 | 83 | 83 | 0.0 | -0.9 | 0.9 |

Figure 2. DRIFTER mean daily count. JANUARY 2003
All hours
Global average number of observations in 24 hours = 8935


150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
5 12 27 26 1 81 29 18 0 8 15 1 5 4 4 8
187 8 64 0 18 3 5 39 48
3 44 18 114 301 44 0
27 16 43 53 35 9 66 73 188 78 31 0 20 0
19 16 46 67 47 39 9 12 92 85 67 95 108 9 28 6 25 4 0
10 1 18 11 55 18 61 0 53 57 81 115 32 21 16 22 21 30 22 29 10 25
20 10 11 8 25 1 42 90 30 30 60 9 22 9 22 0 37 69 49 10 6
22 9 1 26 55 17 17 9 8 8 12 62 21 33 10 0 24 42 16 31 21 13 43 38 45 9 20 31
8 22 32 47 11 13 22 13 12 12 8 8 17 17 26 11 9 2 2 50 35 16 21 4 3 14 8
42 64 86 13 8 7 8 12 1 16 10 18 5 2 8 9 23 59 10 7 2 4 19 19
38 67 62 18 27 56 33 13 8 6 7 17 4 7 3 4 5 17 53 23 60 4 50 17 30 22
20 2 20 46 9 35 56 50 23 29 3 26 30 59 3 19 24 9 4 13 25 20 29 18 6 49
11 7 26 14 14 12 6 9 21 19 12 16 18 36 17 22 7 15 44 65 67 60 43 41 45 10 23 0 0 35 50 46
15 42 77 37 21 23 11 15 15 10 12 103 53 12 32 49 51 56 30 9 11 103 21 36 140 76 3 52 4 1 1 10 24
21 26 20 29 13 91 12 43 29 32 26 57 18 5 19 32 8 1 42
3 18 2 32 7 5 2 1 0 2 17
0
0

## TABLE 3

## MONITORING OF LAND SURFACE OBSERVATIONS
## MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for synops & autosynops. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00, 06, 12, 18 UTC |
| **Elements monitored** | | :Surface pressure (hPa). |
| **Parameters monitored** | :HT(m) | :Station height (in metres) as given in WMO No. 9 Vol A |
| | :RP | :Pressure reporting practice<br>M=mean sea level pressure (hPa) reported.<br>S=Station level pressure reported.<br>8=Geopotential height (m) of 850 hPa surface reported.<br>7=Geopotential height (m) of 700 hPa surface reported. |
| | :NOBS | :Number of observations received excluding duplicates. |
| | :NGE | :Number of observations with gross errors. |
| | :PGE | :Percentage of observations with gross errors. |
| | :%REJ | :Percentage of observations flagged excluding those with gross errors. |
| | :SD | :SD of difference of observations from background values excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors. |
| **GROSS ERROR LIMIT** | :15 hPa | (pressure) |
| **SELECTION CRITERIA** | :NOBS | ≥ 20 ,and one or more of the following: |
| | 1.\|bias\| | ≥ 4 hPa |
| | 2. SD | ≥ 6 hPa |
| | 3.PGE | ≥ 25. |

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

WMO REGION 1:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60728 | 36.4N | 10.7E | 1 | MS | 65 | 0 | 0 | 0 | 0.8 | -8.8 | 8.8 |
| 61967 | 7.3S | 72.4E | 1 | M | 62 | 0 | 0 | 71 | 4.4 | 6.7 | 8.0 |
| 62271 | 24.2N | 23.3E | 417 | M | 41 | 0 | 0 | 0 | 1.0 | 4.0 | 4.1 |
| 62790 | 12.1N | 24.9E | 674 | M | 69 | 1 | 1 | 6 | 2.6 | 4.1 | 4.9 |
| 63801 | 4.9S | 29.6E | 882 | S8 | 107 | 4 | 4 | 0 | 1.1 | 7.7 | 7.8 |
| 65355 | 9.8N | 1.1E | 342 | MS | 112 | 0 | 0 | 0 | 1.3 | -12.4 | 12.5 |
| 67223 | 13.1S | 39.0E | 534 | M | 62 | 22 | 35 | 98 | 2.8 | 13.5 | 13.8 |
| 67229 | 14.7S | 34.3E | 1270 | 8 | 41 | 32 | 78 | 76 | 1.1 | 2.2 | 2.5 |
| 67308 | 22.1S | 31.7E | 452 | M | 24 | 24 | 100 | 0 |  |  |  |
| 68014 | 19.6S | 18.1E | 1411 | S8 | 79 | 0 | 0 | 1 | 1.4 | -4.0 | 4.2 |
| 68030 | 18.5S | 25.6E | 1071 | 8 | 66 | 4 | 6 | 3 | 0.8 | 4.5 | 4.6 |
| 68038 | 20.5S | 26.0E | 903 | 8 | 61 | 1 | 2 | 7 | 0.9 | 4.0 | 4.1 |
| 68312 | 26.5S | 18.1E | 1067 | S8 | 81 | 0 | 0 | 1 | 1.2 | 6.9 | 7.0 |
| 68338 | 26.9S | 24.6E | 1234 | S8 | 48 | 31 | 65 | 0 | 1.5 | 0.0 | 1.5 |
| 68370 | 26.5S | 29.4E | 1660 | S8 | 70 | 19 | 27 | 0 | 0.6 | -0.8 | 1.0 |
| 68380 | 26.1S | 30.1E | 1696 | S8 | 60 | 18 | 30 | 2 | 1.2 | 0.5 | 1.3 |
| 68396 | 26.5S | 31.3E | 641 | S8 | 53 | 0 | 0 | 2 | 1.3 | 5.3 | 5.5 |
| 68575 | 30.0S | 30.0E | 1175 | S8 | 114 | 114 | 100 | 0 |  |  |  |

WMO REGION 2:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 24329 | 66.3N | 114.3E | 236 | MS | 122 | 2 | 2 | 0 | 1.8 | 4.2 | 4.6 |
| 24382 | 66.4N | 143.2E | 196 | MS | 62 | 0 | 0 | 21 | 3.0 | 4.6 | 5.5 |
| 24671 | 63.9N | 135.9E | 402 | MS | 123 | 10 | 8 | 0 | 4.2 | 7.3 | 8.4 |
| 24688 | 63.3N | 143.2E | 741 | MS | 119 | 34 | 29 | 0 | 5.2 | 5.1 | 7.3 |
| 30554 | 54.5N | 113.6E | 995 | MS | 123 | 0 | 0 | 0 | 3.4 | 7.8 | 8.5 |
| 30669 | 53.1N | 117.5E | 708 | MS | 23 | 0 | 0 | 0 | 1.3 | -5.1 | 5.3 |
| 30967 | 49.9N | 115.8E | 623 | MS | 92 | 0 | 0 | 0 | 2.7 | -7.6 | 8.1 |
| 31123 | 57.8N | 130.9E | 255 | MS | 122 | 0 | 0 | 0 | 3.1 | 5.3 | 6.1 |
| 31137 | 56.3N | 131.1E | 850 | MS | 121 | 20 | 17 | 0 | 5.0 | 4.4 | 6.7 |
| 35358 | 49.6N | 63.5E | 123 | MS | 107 | 1 | 1 | 20 | 3.2 | -4.8 | 5.8 |
| 36020 | 52.5N | 80.2E | 59 | MS | 62 | 11 | 18 | 34 | 6.5 | -6.0 | 8.8 |
| 36096 | 51.7N | 94.5E | 628 | M | 120 | 9 | 8 | 0 | 3.9 | 8.0 | 8.9 |
| 36982 | 41.9N | 78.2E | 3635 | S7 | 120 | 5 | 4 | 2 | 1.0 | 6.3 | 6.4 |
| 40700 | 39.6N | 47.9E | 45 | MS | 110 | 1 | 1 | 4 | 1.1 | -7.5 | 7.6 |
| 40713 | 37.4N | 46.3E | 1475 | MS | 108 | 3 | 3 | 0 | 1.2 | 13.3 | 13.4 |
| 40726 | 36.8N | 45.7E | 1384 | MS | 98 | 2 | 2 | 0 | 1.0 | 4.0 | 4.1 |
| 40741 | 36.5N | 61.2E | 235 | MS | 104 | 0 | 0 | 0 | 1.1 | -5.1 | 5.2 |
| 40757 | 35.6N | 53.4E | 1171 | MS | 100 | 0 | 0 | 1 | 2.3 | 5.2 | 5.7 |
| 40780 | 33.6N | 46.4E | 1362 | MS | 87 | 1 | 1 | 14 | 1.5 | 4.5 | 4.7 |
| 40836 | 30.8N | 51.7E | 1837 | MS | 102 | 2 | 2 | 0 | 0.9 | 4.1 | 4.2 |
| 41254 | 23.1N | 57.6E | 1755 | S | 83 | 83 | 100 | 0 |  |  |  |
| 41314 | 17.7N | 54.0E | 467 | MS | 119 | 0 | 0 | 0 | 0.9 | 4.0 | 4.1 |
| 41396 | 16.0N | 48.9E | 700 | MS | 66 | 0 | 0 | 3 | 1.8 | 6.7 | 6.9 |
| 43415 | 8.8N | 80.5E | 98 | S | 62 | 61 | 98 | 0 | 0.0 | -0.1 | 0.1 |
| 44212 | 50.0N | 92.1E | 940 | MS | 121 | 1 | 1 | 51 | 2.3 | 5.1 | 5.6 |
| 44265 | 46.1N | 91.5E | 1186 | MS | 118 | 0 | 0 | 0 | 1.9 | 4.6 | 5.0 |
| 44304 | 47.3N | 110.6E | 1035 | MS | 121 | 0 | 0 | 0 | 1.2 | -6.1 | 6.2 |
| 44416 | 28.6N | 81.6E | 720 | MS | 43 | 0 | 0 | 2 | 1.4 | 4.3 | 4.5 |
| 47022 | 40.8N | 128.2E | 1224 | S | 97 | 1 | 1 | 11 | 1.8 | 4.4 | 4.8 |
| 48924 | 21.1N | 101.5E | 644 | S | 23 | 1 | 4 | 0 | 0.9 | 10.4 | 10.4 |
| 48925 | 20.7N | 102.0E | 550 | M | 26 | 13 | 50 | 15 | 1.1 | -11.6 | 11.7 |
| 48935 | 19.5N | 103.1E | 1050 | 8 | 33 | 0 | 0 | 6 | 1.2 | -9.1 | 9.2 |
| 50727 | 47.2N | 120.0E | 1028 | MS | 123 | 0 | 0 | 94 | 1.0 | 4.6 | 4.7 |
| 51288 | 45.4N | 90.5E | 1651 | S | 122 | 0 | 0 | 15 | 1.7 | -6.7 | 6.9 |
| 51334 | 44.6N | 82.9E | 321 | M | 122 | 0 | 0 | 44 | 3.0 | 6.3 | 7.0 |

WMO REGION 2:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 51379 | 44.0N | 89.6E | 794 | M | 123 | 0 | 0 | 16 | 2.7 | 7.0 | 7.5 |
| 51495 | 43.2N | 91.7E | 874 | M | 121 | 19 | 16 | 12 | 2.5 | 11.4 | 11.7 |
| 51818 | 37.6N | 78.3E | 1376 | M | 122 | 0 | 0 | 35 | 2.8 | 6.6 | 7.2 |
| 52378 | 41.4N | 102.4E | 960 | M | 122 | 0 | 0 | 30 | 2.3 | 4.6 | 5.1 |
| 52866 | 36.6N | 101.8E | 2262 | S | 123 | 0 | 0 | 0 | 1.1 | -4.8 | 4.9 |
| 53083 | 44.6N | 114.2E | 1183 | M | 123 | 1 | 1 | 0 | 3.1 | 8.8 | 9.3 |
| 53352 | 41.7N | 110.4E | 1377 | M | 123 | 0 | 0 | 50 | 3.2 | 7.9 | 8.5 |
| 53480 | 41.0N | 113.1E | 1416 | M | 123 | 0 | 0 | 34 | 2.8 | 6.5 | 7.1 |
| 53487 | 40.1N | 113.3E | 1069 | M | 122 | 0 | 0 | 25 | 2.6 | 6.0 | 6.5 |
| 53502 | 39.8N | 105.8E | 1143 | M | 123 | 0 | 0 | 53 | 3.0 | 5.4 | 6.2 |
| 53593 | 39.8N | 114.6E | 910 | M | 122 | 0 | 0 | 49 | 2.6 | 6.5 | 7.0 |
| 53673 | 38.8N | 112.7E | 838 | M | 123 | 0 | 0 | 11 | 2.5 | 4.0 | 4.7 |
| 53705 | 37.5N | 105.7E | 1185 | M | 122 | 0 | 0 | 23 | 2.4 | 4.8 | 5.4 |
| 53764 | 37.5N | 111.1E | 951 | M | 123 | 0 | 0 | 15 | 2.4 | 4.9 | 5.5 |
| 53787 | 37.1N | 113.0E | 1042 | M | 123 | 0 | 0 | 22 | 2.1 | 4.5 | 5.0 |
| 54115 | 43.6N | 118.1E | 800 | M | 123 | 0 | 0 | 2 | 1.8 | 4.3 | 4.7 |
| 54308 | 41.2N | 116.6E | 661 | M | 123 | 0 | 0 | 3 | 1.9 | 4.2 | 4.6 |
| 54311 | 41.9N | 117.8E | 844 | M | 123 | 0 | 0 | 6 | 2.3 | 5.0 | 5.5 |
| 54386 | 41.4N | 128.2E | 1018 | M | 123 | 0 | 0 | 51 | 2.9 | 6.7 | 7.3 |
| 56193 | 32.4N | 104.5E | 877 | M | 123 | 0 | 0 | 11 | 2.4 | 4.6 | 5.2 |
| 56287 | 30.0N | 103.0E | 629 | M | 123 | 0 | 0 | 3 | 1.9 | 5.0 | 5.3 |
| 56385 | 29.5N | 103.3E | 3049 | S | 123 | 0 | 0 | 57 | 2.4 | -4.9 | 5.5 |
| 56462 | 29.0N | 101.5E | 2994 | S | 123 | 0 | 0 | 0 | 1.6 | 8.9 | 9.0 |
| 56768 | 25.0N | 101.5E | 1773 | S | 123 | 0 | 0 | 98 | 0.7 | -4.1 | 4.2 |
| 57006 | 34.6N | 105.8E | 1143 | M | 123 | 0 | 0 | 2 | 1.8 | 4.7 | 5.0 |
| 57016 | 34.3N | 107.1E | 610 | M | 123 | 0 | 0 | 12 | 1.9 | 4.1 | 4.5 |
| 57816 | 26.6N | 106.7E | 1074 | MS | 123 | 118 | 96 | 0 | 0.3 | -14.6 | 14.6 |

WMO REGION 3:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 80099 | 7.1N | 70.7W | 122 | MS | 37 | 0 | 0 | 3 | 1.7 | -8.0 | 8.2 |
| 82181 | 2.0S | 54.1W | 146 | MS | 88 | 0 | 0 | 0 | 0.7 | 5.5 | 5.5 |
| 82704 | 7.6S | 72.7W | 170 | MS | 84 | 0 | 0 | 0 | 1.2 | -4.6 | 4.8 |
| 83235 | 12.4S | 46.4W | 604 | MS | 92 | 0 | 0 | 0 | 0.7 | 6.9 | 6.9 |
| 83332 | 14.1S | 46.4W | 826 | MS | 92 | 55 | 60 | 0 | 0.7 | 14.1 | 14.1 |
| 83470 | 17.9S | 50.9W | 727 | MS | 92 | 0 | 0 | 0 | 0.8 | -5.2 | 5.3 |
| 83531 | 18.6S | 46.5W | 940 | MS | 90 | 0 | 0 | 0 | 0.6 | -6.0 | 6.0 |
| 83836 | 25.5S | 50.6W | 837 | MS | 92 | 0 | 0 | 0 | 0.9 | -5.1 | 5.2 |
| 84425 | 5.9S | 76.1W | 179 | M | 76 | 0 | 0 | 0 | 1.3 | 4.1 | 4.3 |
| 84455 | 6.5S | 76.4W | 281 | MS | 74 | 0 | 0 | 0 | 1.5 | 7.0 | 7.2 |
| 84472 | 7.1S | 78.5W | 2620 | S | 43 | 0 | 0 | 0 | 0.8 | -5.4 | 5.5 |
| 84474 | 7.2S | 76.7W | 350 | M | 20 | 0 | 0 | 0 | 1.3 | 9.0 | 9.1 |
| 84686 | 13.6S | 72.0W | 3248 | S | 101 | 1 | 1 | 1 | 0.8 | -4.7 | 4.8 |
| 84688 | 13.7S | 73.4W | 3444 | S | 41 | 0 | 0 | 0 | 0.4 | -12.2 | 12.2 |
| 84720 | 14.9S | 75.0W | 567 | MS | 48 | 2 | 4 | 0 | 0.8 | 4.9 | 5.0 |
| 84782 | 18.1S | 70.3W | 468 | MS | 82 | 0 | 0 | 0 | 1.3 | 7.7 | 7.8 |
| 85264 | 18.5S | 64.1W | 1998 | S | 61 | 61 | 100 | 0 |  |  |  |
| 85312 | 19.8S | 63.9W | 992 | S | 46 | 0 | 0 | 0 | 1.4 | -10.6 | 10.7 |
| 85406 | 18.3S | 70.3W | 55 | M | 122 | 0 | 0 | 0 | 1.1 | 4.3 | 4.4 |
| 85432 | 22.5S | 68.9W | 2320 | S8 | 82 | 0 | 0 | 0 | 0.6 | 5.8 | 5.8 |
| 87904 | 60.3S | 72.1W | 199 | MS | 121 | 47 | 39 | 0 | 5.5 | 3.1 | 6.3 |

WMO REGION 4:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 71021 | 61.3N | 124.5W | 283 | MS | 122 | 0 | 0 | 32 | 2.8 | 5.4 | 6.1 |
| 71049 | 66.0N | 91.8W | 150 | S | 122 | 92 | 75 | 11 | 0.5 | 14.2 | 14.2 |
| 71177 | 57.1N | 61.5W | 834 | MS | 120 | 0 | 0 | 10 | 2.0 | -4.5 | 4.9 |
| 71179 | 54.7N | 58.4W | 683 | MS | 120 | 0 | 0 | 26 | 1.8 | -4.1 | 4.5 |
| 71181 | 47.1N | 55.3W | 29 | MS | 114 | 0 | 0 | 0 | 0.9 | -6.4 | 6.5 |
| 71423 | 49.1N | 61.7W | 7 | S | 61 | 2 | 3 | 56 | 6.1 | -4.3 | 7.5 |
| 71475 | 49.3N | 124.8W | 2 | M | 116 | 0 | 0 | 0 | 1.2 | -7.2 | 7.3 |
| 71506 | 67.0N | 136.2W | 720 | MS | 122 | 0 | 0 | 13 | 1.9 | -6.2 | 6.5 |
| 71599 | 44.4N | 65.2W | 127 | MS | 122 | 0 | 0 | 0 | 0.9 | -5.0 | 5.1 |
| 71747 | 48.8N | 91.6W | 424 | MS | 113 | 0 | 0 | 0 | 0.7 | 4.1 | 4.2 |
| 72327 | 36.1N | 86.7W | 182 | MS | 123 | 0 | 0 | 0 | 0.7 | 4.1 | 4.2 |
| 76055 | 31.0N | 114.9W | 440 | MS | 30 | 30 | 100 | 0 | | | |
| 76118 | 30.4N | 109.7W | 1041 | MS | 21 | 0 | 0 | 0 | 0.7 | -11.1 | 11.1 |
| 76491 | 23.8N | 99.1W | 355 | MS | 73 | 0 | 0 | 0 | 1.2 | 4.2 | 4.4 |
| 76543 | 22.0N | 98.8W | 104 | MS | 29 | 0 | 0 | 0 | 0.9 | 8.0 | 8.1 |
| 76743 | 18.0N | 92.9W | 16 | MS | 53 | 0 | 0 | 0 | 0.6 | 6.2 | 6.2 |
| 76762 | 17.5N | 99.5W | 1265 | MS | 69 | 1 | 1 | 1 | 1.1 | 5.5 | 5.6 |
| 76903 | 14.9N | 92.3W | 118 | MS | 90 | 0 | 0 | 0 | 0.7 | 5.5 | 5.5 |

WMO REGION 5:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 92010 | 6.1S | 145.4E | 1587 | M | 39 | 0 | 0 | 0 | 0.8 | 9.5 | 9.5 |
| 94130 | 14.8S | 131.9E | 120 | MS | 123 | 0 | 0 | 0 | 1.6 | 5.6 | 5.8 |
| 94541 | 29.8S | 151.1E | 584 | MS | 123 | 0 | 0 | 65 | 0.9 | -8.3 | 8.3 |
| 96505 | 3.7N | 115.7E | 911 | S8 | 44 | 37 | 84 | 2 | 0.8 | -1.5 | 1.7 |
| 98222 | 17.6N | 120.4E | 31 | M | 117 | 0 | 0 | 63 | 1.6 | -7.7 | 7.9 |
| 98553 | 11.6N | 125.4E | 6 | M | 117 | 0 | 0 | 69 | 3.0 | -6.0 | 6.7 |

WMO REGION 6:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 01360 | 61.9N | 7.9E | 711 | MS | 122 | 0 | 0 | 61 | 1.0 | 5.6 | 5.7 |
| 06605 | 47.1N | 7.1E | 1599 | S8 | 123 | 0 | 0 | 15 | 1.6 | -5.2 | 5.4 |
| 06685 | 47.0N | 9.1E | 515 | MS | 123 | 0 | 0 | 4 | 1.8 | 7.8 | 8.0 |
| 08912 | 42.9N | 0.8W | 1434 | MS | 320 | 320 | 100 | 0 | | | |
| 08922 | 42.8N | 0.2W | 1660 | MS | 173 | 173 | 100 | 0 | | | |
| 10850 | 48.8N | 10.7E | 457 | MS | 369 | 0 | 0 | 22 | 0.5 | -5.5 | 5.5 |
| 11116 | 47.5N | 10.8E | 870 | MS | 60 | 5 | 8 | 3 | 0.8 | 4.5 | 4.6 |
| 11930 | 49.2N | 20.2E | 2633 | S7 | 123 | 0 | 0 | 20 | 2.4 | -4.0 | 4.7 |
| 12510 | 50.7N | 15.7E | 1603 | S8 | 122 | 0 | 0 | 16 | 2.2 | -4.1 | 4.7 |
| 13269 | 44.3N | 19.9E | 176 | MS | 118 | 0 | 0 | 1 | 1.3 | 8.4 | 8.5 |
| 14554 | 44.9N | 18.4E | 136 | S | 58 | 2 | 3 | 0 | 0.9 | -13.5 | 13.5 |
| 16538 | 40.1N | 9.3E | 1022 | S | 38 | 0 | 0 | 0 | 1.2 | 9.3 | 9.4 |
| 17203 | 38.9N | 40.5E | 1177 | S8 | 123 | 0 | 0 | 2 | 1.3 | 5.3 | 5.5 |
| 37788 | 40.1N | 44.4E | 854 | M | 118 | 0 | 0 | 0 | 2.7 | 5.2 | 5.9 |

ANTARCTIC:

| STATION | LAT | LONG | HT(M) | RP | NOBS | NGE | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 89004 | 71.7S | 2.8W | 815 | MS | 103 | 0 | 0 | 0 | 1.0 | -5.4 | 5.5 |
| 89253 | 63.2S | 55.4W | 75 | M | 238 | 0 | 0 | 0 | 1.4 | 4.4 | 4.6 |
| 89263 | 66.0S | 66.1W | 20 | M | 235 | 174 | 74 | 0 | 9.1 | -1.0 | 9.2 |
| 89264 | 71.4S | 68.9W | 780 | S | 229 | 1 | 0 | 0 | 0.7 | 8.3 | 8.3 |
| 89266 | 72.2S | 60.2W | 91 | S | 188 | 185 | 98 | 0 | 7.6 | 0.4 | 7.6 |
| 89272 | 75.0S | 70.8W | 1395 | S | 264 | 264 | 100 | 0 | | | |
| 89327 | 73.2S | 127.1W | 230 | S | 245 | 85 | 35 | 0 | 3.7 | 2.1 | 4.3 |
| 89572 | 68.9S | 78.0E | 363 | S | 50 | 50 | 100 | 68 | | | |
| 89637 | 69.5S | 130.0E | 2560 | S | 309 | 181 | 59 | 23 | 1.7 | 13.3 | 13.4 |
| 89661 | 73.1S | 169.6E | 200 | S | 24 | 0 | 0 | 21 | 2.1 | 7.0 | 7.3 |
| 89666 | 76.7S | 163.0E | 200 | S | 22 | 22 | 100 | 41 | | | |
| 89744 | 74.0S | 43.1E | 3353 | S | 279 | 0 | 0 | 0 | 0.6 | 7.1 | 7.1 |

## TABLE 4A

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Statistics for each airline carrier.

**Area monitored** :90°N - 90°S, 180°W - 180°E.

**Standard of comparison** :Background field from UKMO global model.

**Observation times** :All hours combined.

**Level(s) monitored** :300.0 - 150.0 hPa

**Elements monitored** :TEMP in °C ; WIND in m s$^{-1}$

**Parameters monitored**

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

**GROSS ERROR LIMITS** :10.0 °C ; 60 m s$^{-1}$ Vector Wind

**SELECTION CRITERIA** :N REP ≥ 20

**NB:** All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

|  | TEMPERATURE |  |  |  |  | WIND |  |  |  |  |
|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAH | 3122 | 1 | 40 | 1.9 | 0.3 | 3116 | 0 | 39 | 0 | 8.3 | 0.9 |
| AAL | 5998 | 1 | 38 | 1.6 | 0.0 | 5816 | 0 | 39 | 0 | 8.4 | 0.3 |
| AAR | 1441 | 0 | 7 | 2.0 | -0.7 | 1418 | 0 | 8 | 0 | 8.2 | 0.3 |
| ACA | 4022 | 0 | 16 | 1.8 | -0.6 | 3683 | 0 | 17 | 0 | 8.1 | 0.4 |
| ACI | 36 | 0 | 33 | 1.0 | 0.1 | 36 | 0 | 33 | 0 | 5.7 | 0.5 |
| AEA | 935 | 0 | 4 | 1.6 | 0.4 | 486 | 0 | 3 | 0 | 6.4 | 0.3 |
| AEL | 865 | 1 | 9 | 1.8 | -0.1 | 700 | 0 | 11 | 0 | 8.1 | 0.6 |
| AFL | 518 | 1 | 3 | 1.7 | 0.4 | 428 | 0 | 1 | 0 | 6.3 | 1.0 |
| AFR | 2049 | 1 | 6 | 1.5 | 0.2 | 1625 | 0 | 8 | 0 | 8.0 | 0.5 |
| AIS | 444 | 0 | 9 | 1.8 | -0.5 | 391 | 0 | 10 | 0 | 8.1 | -0.3 |
| AJM | 407 | 0 | 1 | 1.6 | -0.3 | 316 | 0 | 3 | 0 | 7.3 | 0.2 |
| AJX | 323 | 0 | 10 | 1.4 | 0.3 | 323 | 1 | 12 | 0 | 7.2 | 0.5 |
| AMM | 124 | 1 | 7 | 1.5 | -0.1 | 100 | 1 | 9 | 0 | 8.0 | 0.7 |
| AMT | 1221 | 0 | 44 | 1.5 | -0.1 | 1212 | 0 | 45 | 0 | 8.5 | 0.4 |
| AMX | 258 | 1 | 3 | 1.9 | 0.0 | 196 | 1 | 68 | 0 | 11.4 | 1.0 |
| ANA | 461 | 1 | 7 | 1.7 | 0.3 | 462 | 1 | 9 | 0 | 7.0 | 0.6 |
| ANZ | 4904 | 0 | 29 | 1.2 | 0.2 | 4857 | 0 | 28 | 0 | 6.2 | 0.5 |
| ARG | 36 | 0 | 22 | 2.0 | 1.3 | 24 | 0 | 29 | 0 | 8.6 | 0.1 |
| ATN | 74 | 0 | 100 | 3.8 | -1.6 | 74 | 0 | 43 | 0 | 12.3 | 2.7 |
| AUA | 50 | 0 | 6 | 1.5 | -0.3 | 45 | 0 | 9 | 0 | 6.4 | 0.5 |
| AVA | 273 | 1 | 4 | 1.9 | 0.9 | 150 | 0 | 4 | 0 | 7.8 | 0.3 |
| AVN | 180 | 0 | 48 | 1.3 | 0.3 | 178 | 0 | 48 | 0 | 6.5 | 0.7 |
| AZA | 481 | 1 | 9 | 2.3 | 0.2 | 408 | 1 | 7 | 0 | 8.6 | 0.6 |
| BAL | 224 | 0 | 8 | 1.3 | 0.2 | 184 | 0 | 10 | 0 | 10.2 | 0.5 |
| BAW | 904 | 1 | 8 | 1.8 | -0.3 | 821 | 0 | 8 | 0 | 8.4 | 0.4 |
| BBR | 235 | 1 | 3 | 1.5 | 0.7 | 137 | 0 | 2 | 0 | 8.9 | -0.2 |
| BHP | 34 | 0 | 0 | 1.2 | -0.2 | 22 | 0 | 0 | 0 | 4.0 | -0.1 |
| BPA | 60 | 10 | 65 | 6.2 | 4.4 | 57 | 0 | 11 | 0 | 8.9 | 0.3 |
| BSK | 80 | 3 | 18 | 2.4 | -0.1 | 78 | 0 | 28 | 0 | 14.9 | 1.2 |
| BWA | 318 | 0 | 4 | 1.5 | 0.3 | 220 | 0 | 6 | 0 | 7.9 | 1.1 |
| CAL | 67 | 0 | 10 | 2.6 | 0.2 | 68 | 1 | 7 | 0 | 12.2 | 0.6 |
| CCA | 308 | 0 | 14 | 2.5 | 0.3 | 324 | 1 | 100 | 0 | 12.8 | -0.5 |
| CES | 418 | 1 | 7 | 2.0 | 0.4 | 421 | 2 | 10 | 0 | 9.3 | -0.2 |
| CFG | 1181 | 1 | 3 | 1.5 | -0.6 | 969 | 0 | 4 | 0 | 7.3 | 0.1 |
| CGA | 118 | 0 | 2 | 1.4 | -0.2 | 112 | 0 | 2 | 0 | 6.1 | 1.7 |
| CGF | 45 | 0 | 0 | 1.7 | -0.7 | 44 | 0 | 0 | 0 | 4.8 | 0.7 |
| CGH | 148 | 0 | 2 | 1.5 | -0.3 | 138 | 0 | 2 | 0 | 5.1 | 0.6 |
| CKS | 281 | 0 | 43 | 1.9 | 0.2 | 278 | 0 | 43 | 0 | 6.7 | 0.8 |
| CLX | 346 | 1 | 4 | 1.7 | -0.3 | 277 | 0 | 5 | 0 | 6.5 | 0.2 |
| CMI | 65 | 3 | 35 | 1.8 | -0.1 | 66 | 0 | 32 | 0 | 8.3 | -0.5 |
| COA | 769 | 0 | 49 | 1.5 | -0.3 | 720 | 0 | 50 | 0 | 8.7 | 0.4 |
| CPA | 45 | 0 | 4 | 1.9 | 0.6 | 47 | 0 | 6 | 0 | 5.2 | -0.6 |
| CRL | 817 | 1 | 6 | 1.6 | 0.3 | 585 | 0 | 7 | 0 | 8.1 | 0.6 |
| CSN | 194 | 0 | 10 | 2.2 | -0.3 | 194 | 0 | 10 | 0 | 7.6 | 0.5 |
| CUB | 292 | 3 | 16 | 3.2 | 1.2 | 220 | 0 | 7 | 0 | 9.0 | 0.7 |
| DAB | 287 | 0 | 3 | 1.5 | -0.3 | 271 | 0 | 2 | 0 | 5.6 | 1.1 |
| DAI | 226 | 0 | 2 | 1.4 | 0.2 | 220 | 0 | 2 | 0 | 5.1 | 1.2 |
| DAL | 2836 | 0 | 40 | 1.6 | -0.2 | 2763 | 0 | 42 | 0 | 7.8 | 0.3 |
| DBR | 52 | 4 | 8 | 1.9 | -0.7 | 50 | 0 | 2 | 0 | 6.6 | 0.4 |
| DCE | 178 | 1 | 7 | 1.5 | 0.1 | 164 | 0 | 9 | 0 | 6.9 | 0.7 |
| DCS | 24 | 0 | 8 | 1.7 | -0.6 | 24 | 0 | 8 | 0 | 4.2 | -0.6 |
| DHL | 64 | 2 | 100 | 6.6 | -6.2 | 62 | 0 | 100 | 0 | 16.2 | 7.1 |
| DLH | 1103 | 0 | 9 | 1.5 | -0.1 | 989 | 0 | 10 | 0 | 7.3 | 1.1 |
| ECI | 22 | 9 | 14 | 2.4 | -1.0 | 20 | 0 | 10 | 0 | 9.9 | 2.4 |
| EDW | 104 | 0 | 4 | 1.3 | -0.3 | 79 | 3 | 8 | 0 | 9.0 | 0.7 |
| EEZ | 31 | 3 | 19 | 1.3 | -0.3 | 32 | 0 | 19 | 0 | 7.3 | 0.6 |
| EIA | 317 | 2 | 100 | 3.0 | 1.2 | 303 | 1 | 100 | 0 | 18.9 | 4.4 |
| ELY | 120 | 0 | 0 | 1.7 | -0.1 | 116 | 0 | 3 | 0 | 8.5 | 1.0 |
| ETH | 22 | 0 | 5 | 1.4 | 0.4 | 22 | 0 | 9 | 0 | 7.3 | 2.5 |

| | | TEMPERATURE | | | | | | WIND | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| EVA | 167 | 1 | 9 | 1.8 | -0.6 | 177 | 0 | 10 | 0 | 8.2 | -0.3 |
| FDX | 2001 | 0 | 43 | 1.4 | 0.2 | 2003 | 0 | 43 | 0 | 7.9 | 0.5 |
| FGS | 254 | 0 | 1 | 1.6 | 0.2 | 247 | 0 | 1 | 0 | 5.2 | 1.2 |
| FGZ | 108 | 0 | 1 | 1.4 | -0.2 | 105 | 0 | 1 | 0 | 4.9 | 0.9 |
| FIN | 214 | 0 | 5 | 1.5 | 0.1 | 205 | 0 | 5 | 0 | 7.3 | 0.0 |
| FJI | 1083 | 2 | 48 | 1.4 | 0.4 | 1060 | 0 | 48 | 0 | 7.6 | 0.7 |
| FOM | 762 | 0 | 31 | 1.1 | 0.1 | 749 | 0 | 31 | 0 | 6.0 | 0.6 |
| FWQ | 53 | 0 | 55 | 1.2 | -0.1 | 53 | 0 | 55 | 0 | 6.1 | 0.1 |
| GCO | 312 | 1 | 10 | 1.6 | -0.1 | 312 | 0 | 13 | 0 | 10.4 | 0.6 |
| GHA | 107 | 1 | 4 | 1.4 | -0.3 | 78 | 1 | 10 | 0 | 11.2 | 0.7 |
| GOJ | 22 | 0 | 0 | 1.0 | -0.5 | 22 | 0 | 0 | 0 | 5.1 | 0.9 |
| GRL | 91 | 0 | 0 | 1.2 | -0.2 | 90 | 0 | 1 | 0 | 6.1 | 1.1 |
| GTI | 373 | 1 | 15 | 2.0 | 0.2 | 392 | 1 | 16 | 0 | 9.2 | -0.6 |
| GVA | 42 | 0 | 5 | 1.4 | 0.4 | 41 | 0 | 2 | 0 | 4.8 | -0.4 |
| GVB | 38 | 0 | 0 | 1.5 | 0.4 | 36 | 0 | 0 | 0 | 4.9 | 0.8 |
| GVF | 40 | 0 | 0 | 1.5 | -0.5 | 36 | 0 | 0 | 0 | 5.2 | 1.4 |
| GVG | 51 | 0 | 4 | 1.2 | -0.4 | 49 | 0 | 2 | 0 | 5.3 | 1.1 |
| GVH | 42 | 0 | 0 | 1.2 | -0.1 | 41 | 0 | 0 | 0 | 5.7 | 0.1 |
| GVL | 28 | 0 | 0 | 1.3 | -0.1 | 28 | 0 | 0 | 0 | 6.0 | -0.5 |
| GVR | 114 | 0 | 1 | 1.5 | -0.4 | 111 | 0 | 3 | 0 | 6.2 | 1.1 |
| GVW | 27 | 0 | 4 | 1.6 | -0.8 | 24 | 0 | 8 | 0 | 5.6 | 1.1 |
| GVX | 27 | 0 | 0 | 1.5 | -0.1 | 25 | 0 | 0 | 0 | 5.0 | 1.0 |
| GWW | 64 | 0 | 0 | 1.4 | -0.3 | 61 | 0 | 0 | 0 | 4.3 | 0.2 |
| HAL | 5676 | 0 | 40 | 1.7 | -0.3 | 5655 | 0 | 41 | 0 | 8.7 | 0.9 |
| HRH | 132 | 0 | 67 | 2.5 | 2.0 | 132 | 0 | 67 | 0 | 6.4 | 0.9 |
| HZA | 22 | 0 | 5 | 1.0 | 0.2 | 22 | 0 | 5 | 0 | 6.3 | -0.1 |
| IBE | 3109 | 1 | 4 | 1.6 | 0.4 | 1830 | 0 | 6 | 0 | 8.2 | 0.3 |
| ICE | 642 | 0 | 2 | 1.5 | -0.1 | 665 | 1 | 6 | 0 | 9.1 | 0.6 |
| IWD | 168 | 1 | 2 | 1.5 | -0.1 | 111 | 0 | 4 | 0 | 7.8 | 0.5 |
| JAA | 118 | 1 | 4 | 2.1 | 1.2 | 117 | 0 | 3 | 0 | 7.6 | 3.9 |
| JAL | 2888 | 1 | 6 | 1.6 | 0.3 | 2882 | 0 | 7 | 0 | 7.8 | 0.2 |
| JAZ | 1176 | 0 | 6 | 1.4 | 0.5 | 1180 | 1 | 7 | 0 | 8.2 | 0.5 |
| JBU | 37 | 8 | 8 | 0.8 | 0.1 | 43 | 0 | 0 | 0 | 4.2 | 0.4 |
| JMC | 63 | 0 | 2 | 1.3 | 0.3 | 50 | 0 | 6 | 0 | 10.2 | -0.2 |
| KAI | 20 | 0 | 35 | 2.7 | 2.3 | 20 | 0 | 35 | 0 | 7.5 | 0.4 |
| KAL | 3566 | 1 | 11 | 1.9 | -0.3 | 3552 | 0 | 12 | 0 | 8.3 | 0.5 |
| KLM | 2234 | 0 | 6 | 1.7 | 0.0 | 1811 | 0 | 7 | 0 | 7.7 | 0.7 |
| LAN | 557 | 1 | 6 | 1.6 | -0.1 | 553 | 0 | 6 | 0 | 6.3 | 1.4 |
| LAP | 49 | 0 | 35 | 2.6 | 1.3 | 48 | 0 | 33 | 0 | 8.5 | 1.5 |
| LDI | 607 | 0 | 4 | 1.7 | -0.5 | 422 | 1 | 5 | 0 | 7.9 | -0.2 |
| LIB | 743 | 0 | 3 | 1.8 | 1.1 | 507 | 0 | 6 | 0 | 7.7 | 0.3 |
| LOT | 82 | 0 | 0 | 2.0 | -1.4 | 81 | 0 | 1 | 0 | 8.1 | 0.3 |
| LTU | 715 | 1 | 5 | 1.4 | 0.1 | 596 | 0 | 6 | 0 | 7.3 | 0.1 |
| LXJ | 22 | 0 | 45 | 1.0 | 0.0 | 22 | 0 | 45 | 0 | 7.2 | 2.3 |
| LXR | 28 | 0 | 11 | 2.3 | 0.7 | 21 | 5 | 10 | 0 | 6.6 | 0.9 |
| MAS | 278 | 0 | 8 | 1.8 | -0.4 | 290 | 0 | 10 | 0 | 9.7 | 0.1 |
| MON | 122 | 2 | 7 | 1.6 | 0.1 | 91 | 1 | 8 | 0 | 8.8 | 0.0 |
| MPD | 297 | 0 | 5 | 2.0 | 0.6 | 173 | 1 | 6 | 0 | 8.1 | 0.0 |
| MPH | 517 | 0 | 3 | 1.7 | -0.8 | 478 | 0 | 4 | 0 | 8.2 | 0.4 |
| MYT | 338 | 1 | 3 | 1.5 | -0.1 | 280 | 1 | 3 | 0 | 6.0 | 0.6 |
| NAO | 123 | 1 | 39 | 1.6 | -0.6 | 140 | 0 | 41 | 0 | 7.2 | 0.4 |
| NCA | 926 | 0 | 4 | 1.6 | 0.1 | 690 | 0 | 6 | 0 | 7.5 | 0.1 |
| NGA | 40 | 0 | 0 | 0.9 | -0.5 | 35 | 0 | 0 | 0 | 5.7 | 1.4 |
| NWA | 9101 | 0 | 11 | 1.7 | 0.0 | 9076 | 0 | 11 | 0 | 7.9 | 0.4 |
| NZL | 3722 | 0 | 13 | 1.3 | 0.4 | 3722 | 0 | 13 | 0 | 5.4 | 0.5 |
| OAE | 363 | 1 | 36 | 1.6 | -0.3 | 359 | 0 | 46 | 0 | 12.5 | 2.0 |
| PAC | 770 | 1 | 21 | 1.8 | 0.2 | 769 | 0 | 21 | 0 | 7.6 | 0.2 |
| PAL | 1550 | 1 | 13 | 1.7 | -0.5 | 1461 | 0 | 13 | 0 | 8.8 | 0.2 |
| PAO | 336 | 0 | 58 | 1.7 | 0.9 | 335 | 1 | 60 | 0 | 6.9 | 1.2 |

| | TEMPERATURE | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| PUA | 24 | 4 | 17 | 1.8 | 0.6 | 24 | 4 | 25 | 0 | 11.1 | -0.4 |
| QFA | 2606 | 0 | 42 | 1.3 | 0.5 | 2581 | 0 | 42 | 0 | 6.3 | 0.8 |
| RAM | 289 | 1 | 4 | 1.7 | 0.1 | 157 | 1 | 100 | 0 | 9.3 | 0.3 |
| RCH | 323 | 2 | 100 | 2.4 | 0.3 | 253 | 0 | 100 | 0 | 12.5 | 1.6 |
| RON | 21 | 0 | 48 | 0.8 | -0.3 | 21 | 0 | 48 | 0 | 4.6 | 0.6 |
| RRR | 54 | 13 | 15 | 2.2 | -0.4 | 50 | 2 | 8 | 0 | 7.0 | 1.1 |
| RYN | 60 | 0 | 100 | 3.1 | -0.1 | 59 | 0 | 46 | 0 | 7.4 | 0.6 |
| RZO | 320 | 1 | 5 | 2.1 | -0.1 | 130 | 1 | 4 | 0 | 8.6 | 0.8 |
| SAA | 394 | 1 | 2 | 1.5 | -0.9 | 313 | 0 | 3 | 0 | 7.3 | 0.0 |
| SEU | 143 | 3 | 7 | 2.2 | 0.1 | 128 | 0 | 5 | 0 | 8.7 | 0.9 |
| SIA | 361 | 0 | 2 | 1.5 | 0.2 | 364 | 0 | 1 | 0 | 5.1 | 0.6 |
| SLR | 223 | 1 | 9 | 1.3 | -0.3 | 206 | 1 | 9 | 0 | 7.5 | -0.3 |
| SQC | 54 | 0 | 4 | 1.6 | 0.4 | 54 | 0 | 6 | 0 | 6.4 | 0.0 |
| SSV | 34 | 0 | 18 | 2.1 | -0.8 | 34 | 3 | 18 | 0 | 10.3 | 1.7 |
| SVA | 28 | 0 | 7 | 1.7 | 0.1 | 28 | 0 | 4 | 0 | 4.9 | -0.1 |
| TAG | 29 | 0 | 34 | 2.1 | 0.7 | 29 | 0 | 34 | 0 | 6.7 | 1.2 |
| TAP | 620 | 1 | 4 | 1.5 | -0.3 | 260 | 0 | 5 | 0 | 8.0 | 1.1 |
| TCV | 31 | 6 | 10 | 1.6 | -0.2 | 21 | 0 | 5 | 0 | 14.5 | -0.7 |
| THA | 182 | 1 | 3 | 1.5 | -0.2 | 181 | 0 | 4 | 0 | 7.0 | 1.2 |
| THT | 202 | 2 | 37 | 1.8 | 0.4 | 197 | 1 | 35 | 0 | 9.2 | 0.1 |
| TPA | 38 | 0 | 5 | 1.1 | 0.2 | 36 | 0 | 6 | 0 | 6.8 | -0.3 |
| TSC | 61 | 0 | 10 | 1.5 | -0.1 | 50 | 0 | 8 | 0 | 6.3 | 1.7 |
| UAL | 140341 | 0 | 93 | 1.3 | -0.3 | 140818 | 0 | 93 | 0 | 5.4 | 0.5 |
| UPS | 1824 | 1 | 56 | 1.9 | 0.2 | 1797 | 0 | 55 | 0 | 7.9 | 0.5 |
| USA | 270 | 2 | 5 | 1.8 | 0.1 | 228 | 0 | 6 | 0 | 9.4 | -0.2 |
| VIR | 265 | 0 | 2 | 1.7 | -0.4 | 251 | 1 | 4 | 0 | 8.3 | 0.5 |
| VRG | 131 | 2 | 19 | 1.6 | 0.6 | 134 | 1 | 18 | 0 | 10.6 | 1.1 |
| VVJ | 21 | 0 | 14 | 1.1 | -0.2 | 26 | 0 | 27 | 0 | 12.7 | -1.7 |
| VVR | 82 | 6 | 37 | 2.0 | 0.7 | 81 | 2 | 31 | 0 | 6.4 | 0.4 |
| WOA | 577 | 1 | 14 | 1.8 | 0.1 | 566 | 0 | 19 | 0 | 10.6 | 1.3 |
| YSS | 58 | 2 | 7 | 1.4 | 0.4 | 47 | 0 | 6 | 0 | 7.5 | 0.5 |
| 9VS | 178 | 0 | 4 | 1.5 | -0.3 | 174 | 0 | 4 | 0 | 5.0 | 0.8 |
| AR | 1578 | 0 | 100 | 3.1 | 2.8 | 1574 | 0 | 5 | 0 | 6.3 | 1.1 |
| AU | 38101 | 0 | 10 | 1.2 | 0.6 | 38233 | 0 | 10 | 0 | 5.3 | 0.4 |
| EU | 126243 | 0 | 24 | 1.3 | 0.1 | 126243 | 0 | 24 | 0 | 4.9 | 0.5 |
| HL | 21 | 0 | 10 | 1.7 | -0.7 | 22 | 0 | 14 | 0 | 8.6 | 2.0 |
| KL | 3056 | 0 | 7 | 1.3 | 0.6 | 3043 | 0 | 7 | 0 | 6.5 | 0.9 |
| LH | 2310 | 0 | 8 | 1.7 | 1.2 | 2305 | 0 | 8 | 0 | 5.1 | 0.8 |
| LN | 28 | 0 | 43 | 2.5 | 0.0 | 28 | 0 | 50 | 0 | 19.9 | -3.0 |
| MK | 4185 | 0 | 84 | 2.2 | 1.9 | 4169 | 0 | 7 | 0 | 7.2 | 1.2 |
| SA | 2421 | 0 | 5 | 1.9 | 1.5 | 2418 | 0 | 5 | 0 | 6.7 | 0.5 |
| TN | 81 | 0 | 27 | 2.0 | 0.5 | 91 | 2 | 32 | 0 | 9.3 | 1.4 |
| N | 3006 | 0 | 23 | 1.8 | 0.2 | 3031 | 0 | 23 | 0 | 7.0 | 1.0 |
| US ACARS | 897821 | 0 | 61 | 1.4 | 0.2 | 897813 | 0 | 60 | 0 | 5.5 | 0.6 |

## TABLE 4B

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Statistics for each airline carrier. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :All hours combined. |
| **Level(s) monitored** | | :1000.0 – 300.1 hPa |
| **Elements monitored** | | :TEMP in °C ; WIND in m s$^{-1}$ |
| **Parameters monitored** | | |
| | :N REP. | :Number of observations received excluding duplicates. |
| | :PG | :Percentage of observations with gross errors. |
| | :PR | :Percentage of observations rejected by quality control including rejections from the duplicate check. |
| | :PC | :Percentage of observations with calm winds. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed. |
| **GROSS ERROR LIMITS** | | :10.0 °C ; 60 m s$^{-1}$ Vector Wind |
| **SELECTION CRITERIA** | | :N REP ≥ 20 |

**NB:** All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

| | TEMPERATURE | | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAH | 22 | 14 | 50 | 4.7 | -2.6 | 22 | 0 | 36 | 0 | 6.8 | 1.1 |
| AAL | 386 | 1 | 34 | 2.2 | 0.2 | 375 | 0 | 32 | 0 | 8.8 | 1.2 |
| ACA | 23 | 0 | 13 | 2.0 | -0.3 | 23 | 4 | 17 | 0 | 11.5 | 0.7 |
| AFR | 132 | 1 | 4 | 1.0 | 0.2 | 108 | 0 | 5 | 0 | 9.0 | 0.1 |
| AMT | 54 | 0 | 44 | 1.7 | 0.3 | 55 | 0 | 49 | 0 | 14.5 | -2.0 |
| ANZ | 218 | 0 | 16 | 1.2 | -0.1 | 218 | 0 | 15 | 0 | 5.2 | 0.1 |
| ATN | 60 | 0 | 100 | 4.1 | -2.1 | 61 | 0 | 15 | 0 | 9.2 | 2.1 |
| AZA | 41 | 0 | 7 | 1.1 | -0.1 | 34 | 0 | 9 | 0 | 5.9 | 0.9 |
| CFC | 80 | 0 | 9 | 1.5 | 0.4 | 64 | 0 | 13 | 0 | 7.1 | 1.3 |
| CFG | 72 | 0 | 7 | 1.5 | -0.7 | 52 | 0 | 12 | 0 | 6.7 | 0.7 |
| CMI | 27 | 4 | 37 | 2.0 | -1.2 | 27 | 0 | 37 | 0 | 6.4 | 1.4 |
| COA | 33 | 0 | 45 | 2.9 | -1.0 | 34 | 0 | 38 | 0 | 6.2 | 0.1 |
| CUB | 48 | 0 | 0 | 1.3 | 0.8 | 35 | 0 | 6 | 0 | 7.4 | -1.1 |
| DAL | 341 | 0 | 38 | 1.5 | -0.3 | 352 | 1 | 39 | 0 | 8.3 | -0.2 |
| DLH | 183 | 1 | 11 | 1.4 | 0.0 | 183 | 0 | 11 | 0 | 7.3 | 0.7 |
| EIA | 51 | 0 | 100 | 2.1 | 0.7 | 51 | 0 | 100 | 0 | 21.3 | 3.1 |
| ELY | 27 | 0 | 0 | 1.1 | -0.2 | 28 | 0 | 0 | 0 | 8.1 | 0.7 |
| EVA | 28 | 4 | 36 | 1.9 | -0.6 | 28 | 0 | 32 | 0 | 6.2 | 2.1 |
| FDX | 427 | 1 | 31 | 1.5 | 0.2 | 438 | 0 | 32 | 0 | 9.8 | 0.4 |
| FIN | 34 | 0 | 6 | 1.9 | -0.3 | 26 | 4 | 12 | 0 | 14.4 | -0.8 |
| GCO | 124 | 2 | 15 | 1.4 | 0.2 | 126 | 0 | 21 | 0 | 11.2 | 0.3 |
| GTI | 36 | 0 | 11 | 1.9 | 0.1 | 36 | 0 | 11 | 0 | 9.0 | 0.3 |
| HAL | 294 | 0 | 40 | 2.2 | -0.4 | 284 | 0 | 39 | 0 | 9.1 | 1.8 |
| IBE | 50 | 2 | 2 | 1.2 | 0.1 | 37 | 3 | 8 | 0 | 7.9 | 0.2 |
| ICE | 33 | 0 | 6 | 2.3 | -1.1 | 31 | 0 | 6 | 0 | 10.5 | 3.4 |
| JAA | 56 | 0 | 11 | 1.6 | -0.1 | 56 | 0 | 9 | 0 | 5.3 | 1.3 |
| JAL | 115 | 3 | 10 | 1.1 | 0.5 | 116 | 0 | 9 | 0 | 6.5 | 1.7 |
| JAZ | 206 | 1 | 5 | 1.4 | 0.6 | 205 | 0 | 6 | 0 | 8.2 | 0.2 |
| KAL | 60 | 7 | 13 | 1.9 | -0.4 | 58 | 0 | 17 | 0 | 11.2 | 1.4 |
| KIW | 28 | 4 | 39 | 2.4 | -1.1 | 28 | 0 | 36 | 0 | 8.7 | 1.5 |
| KLM | 69 | 0 | 1 | 1.4 | 0.0 | 56 | 0 | 4 | 0 | 7.9 | -0.1 |
| LAN | 23 | 0 | 4 | 0.9 | -0.1 | 23 | 0 | 4 | 0 | 3.8 | 0.2 |
| LIB | 80 | 0 | 8 | 1.6 | 1.1 | 58 | 0 | 14 | 0 | 8.8 | 1.0 |
| MAS | 32 | 0 | 9 | 2.3 | -1.4 | 32 | 0 | 16 | 0 | 9.7 | 0.9 |
| MPH | 92 | 0 | 4 | 1.2 | -0.2 | 88 | 1 | 8 | 0 | 8.9 | -0.3 |
| NCA | 62 | 0 | 0 | 1.3 | 0.1 | 56 | 0 | 2 | 0 | 6.4 | -0.6 |
| NWA | 635 | 0 | 18 | 1.5 | 0.3 | 632 | 1 | 20 | 0 | 9.1 | 0.1 |
| NZL | 19687 | 0 | 55 | 1.5 | 0.6 | 19687 | 0 | 55 | 0 | 5.2 | 0.0 |
| PAC | 49 | 4 | 27 | 1.6 | -0.3 | 50 | 0 | 26 | 0 | 7.2 | 1.8 |
| PAL | 52 | 2 | 31 | 2.0 | -1.2 | 52 | 0 | 27 | 0 | 7.3 | 1.0 |
| QFA | 122 | 0 | 38 | 1.5 | 0.0 | 122 | 0 | 37 | 0 | 5.2 | 0.0 |
| RCH | 59 | 15 | 100 | 3.4 | -2.0 | 50 | 0 | 100 | 0 | 12.9 | -0.4 |
| RRR | 112 | 6 | 24 | 2.7 | 1.2 | 101 | 0 | 33 | 0 | 15.5 | -0.4 |
| SAA | 26 | 4 | 4 | 1.3 | -1.1 | 23 | 0 | 4 | 0 | 7.7 | 1.1 |
| SIA | 41 | 0 | 0 | 1.0 | 0.3 | 44 | 0 | 0 | 0 | 4.4 | 1.2 |
| SKI | 28 | 4 | 25 | 4.9 | -2.0 | 69 | 0 | 30 | 0 | 18.2 | 1.1 |
| SLR | 39 | 3 | 15 | 2.4 | 0.6 | 36 | 3 | 11 | 0 | 6.5 | 1.1 |
| UAL | 344922 | 0 | 99 | 1.2 | -0.1 | 344521 | 0 | 99 | 0 | 4.5 | 0.3 |
| UPS | 219 | 0 | 46 | 1.6 | 0.3 | 221 | 0 | 47 | 0 | 8.2 | 0.6 |
| VTA | 35 | 0 | 43 | 2.6 | -1.9 | 40 | 0 | 38 | 0 | 5.2 | 1.9 |
| VVP | 36 | 0 | 64 | 5.7 | 4.9 | 36 | 0 | 39 | 0 | 8.1 | -0.3 |
| WOA | 164 | 7 | 17 | 2.6 | 0.6 | 172 | 0 | 16 | 0 | 11.5 | 1.9 |
| AR | 1020 | 0 | 100 | 2.0 | 1.5 | 1013 | 0 | 48 | 0 | 5.5 | 0.2 |
| AU | 29514 | 0 | 52 | 1.4 | 0.3 | 29776 | 0 | 52 | 0 | 4.2 | 0.0 |
| EU | 493330 | 0 | 67 | 1.1 | 0.2 | 490500 | 0 | 67 | 0 | 4.3 | -0.1 |
| KL | 1787 | 0 | 54 | 1.3 | 0.4 | 1780 | 0 | 54 | 0 | 4.5 | 0.5 |
| LH | 1113 | 0 | 60 | 1.2 | 0.6 | 1108 | 0 | 60 | 0 | 4.0 | 0.5 |
| MK | 2240 | 0 | 93 | 1.7 | 1.2 | 2228 | 0 | 52 | 0 | 4.3 | 0.6 |
| SA | 1197 | 0 | 48 | 1.8 | 0.8 | 1197 | 0 | 47 | 0 | 4.6 | 0.3 |
| N | 50 | 0 | 32 | 2.3 | 0.4 | 51 | 2 | 37 | 0 | 11.4 | 0.3 |
| US ACARS | 1777745 | 0 | 78 | 1.3 | 0.4 | 1773188 | 0 | 78 | 0 | 4.4 | 0.3 |

Figure 3a.  AIRCRAFT 300 - 150 hPa mean daily count.  JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 42255

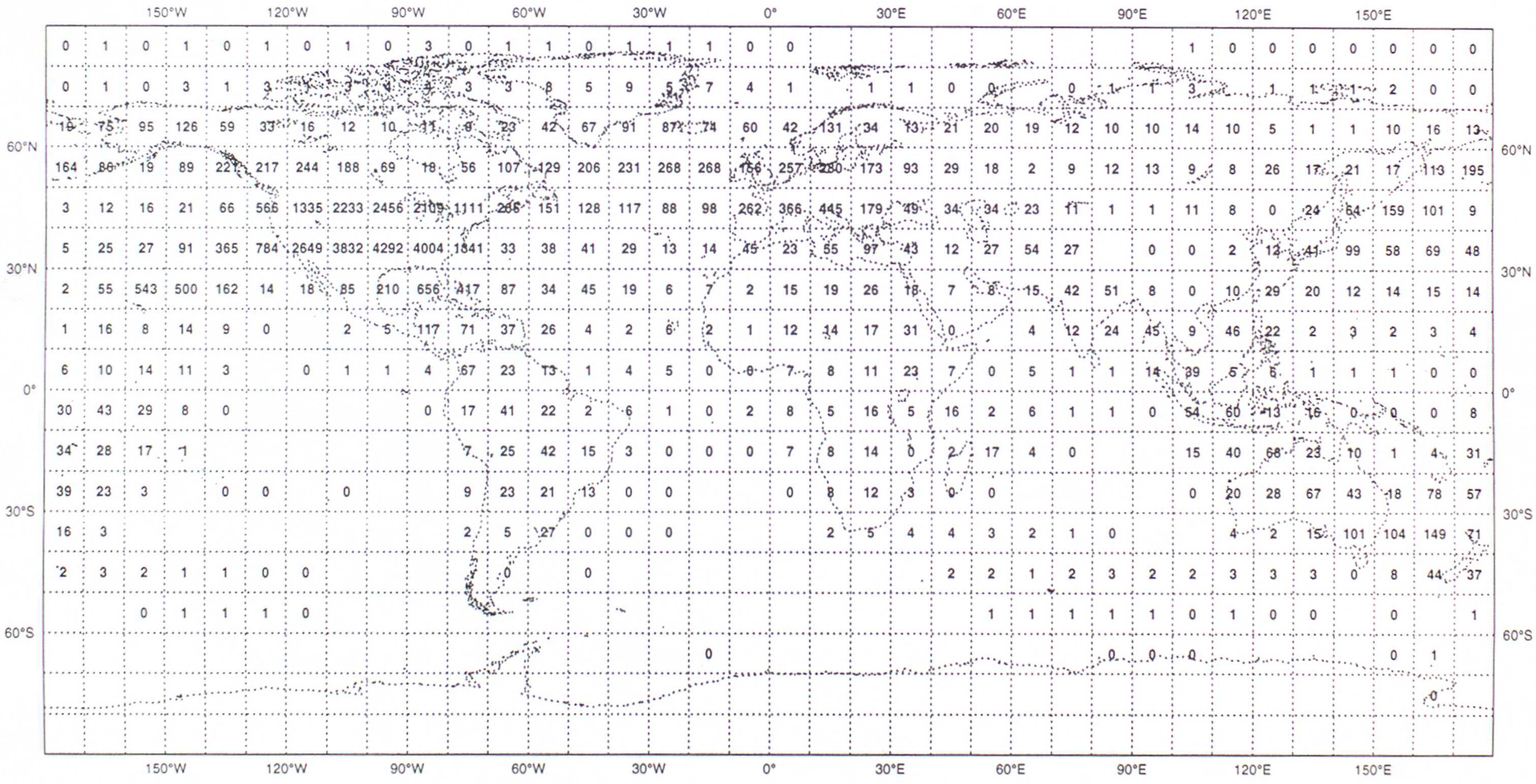

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 86132

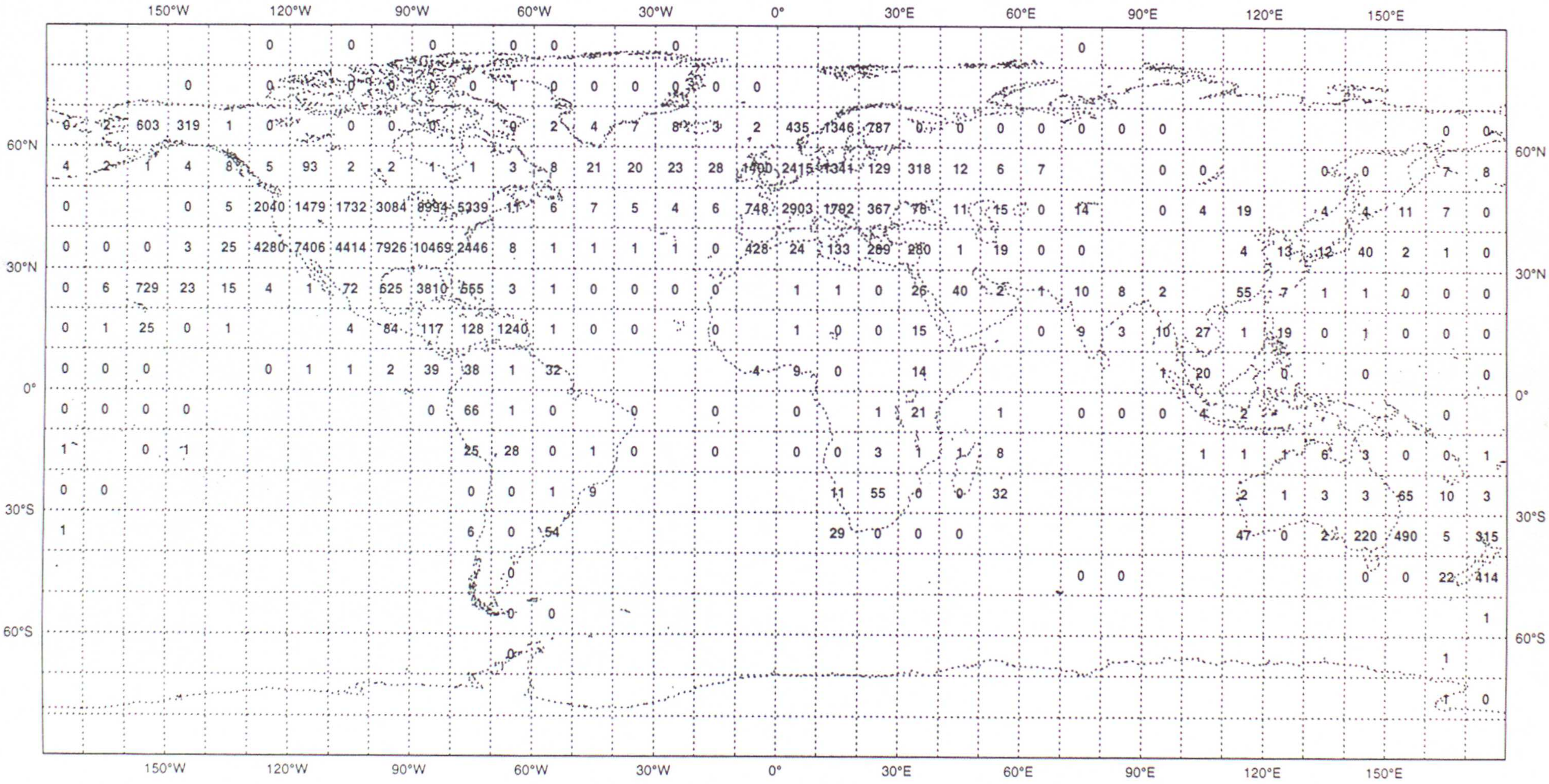

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 0 0 0 0 0
0 0 0 0 0 1 0 0 0 0 0 0
0 2 603 319 1 0 0 0 0 0 2 4 7 8 3 2 435 1346 787 0 0 0 0 0 0 0 0 0 0
4 2 1 4 8 5 93 2 2 1 1 3 8 21 20 23 28 1400 2415 1341 129 318 12 6 7 0 0 0 0 7 8
0 0 5 2040 1479 1732 3084 8994 5239 11 6 7 5 4 6 748 2903 1782 367 78 11 15 0 14 0 4 19 4 4 11 7 0
0 0 0 3 25 4280 7406 4414 7926 10469 2446 8 1 1 1 1 0 428 24 133 289 280 1 19 0 0 4 13 12 40 2 1 0
0 6 729 23 15 4 1 72 625 3810 555 3 1 0 0 0 0 1 1 0 26 40 2 1 10 8 2 55 7 1 1 0 0 0
0 1 25 0 1 4 84 117 128 1240 1 0 0 0 1 0 0 15 0 9 3 10 27 1 19 0 1 0 0 0
0 0 0 0 1 1 2 39 38 1 32 4 9 0 14 1 20 0 0 0
0 0 0 0 0 66 1 0 0 0 0 1 21 1 0 0 0 4 2 0
1 0 1 25 28 0 1 0 0 0 0 3 1 1 8 1 1 1 6 3 0 0 1
0 0 0 0 1 9 11 55 0 0 32 2 1 3 3 65 10 3
1 6 0 54 29 0 0 0 47 0 2 220 490 5 315
0 0 0 0 0 22 414
0 0 1
1
1 0

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

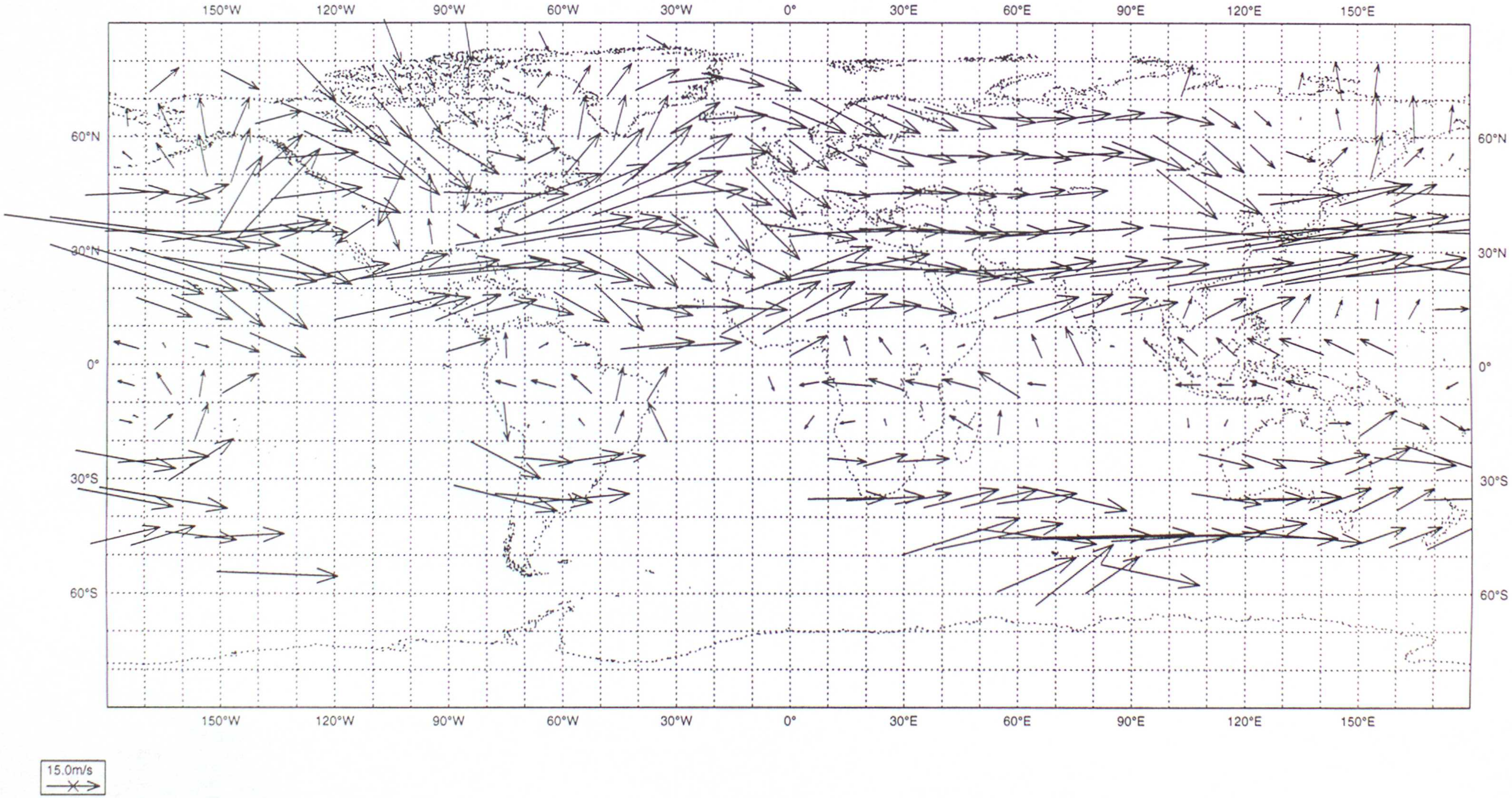

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

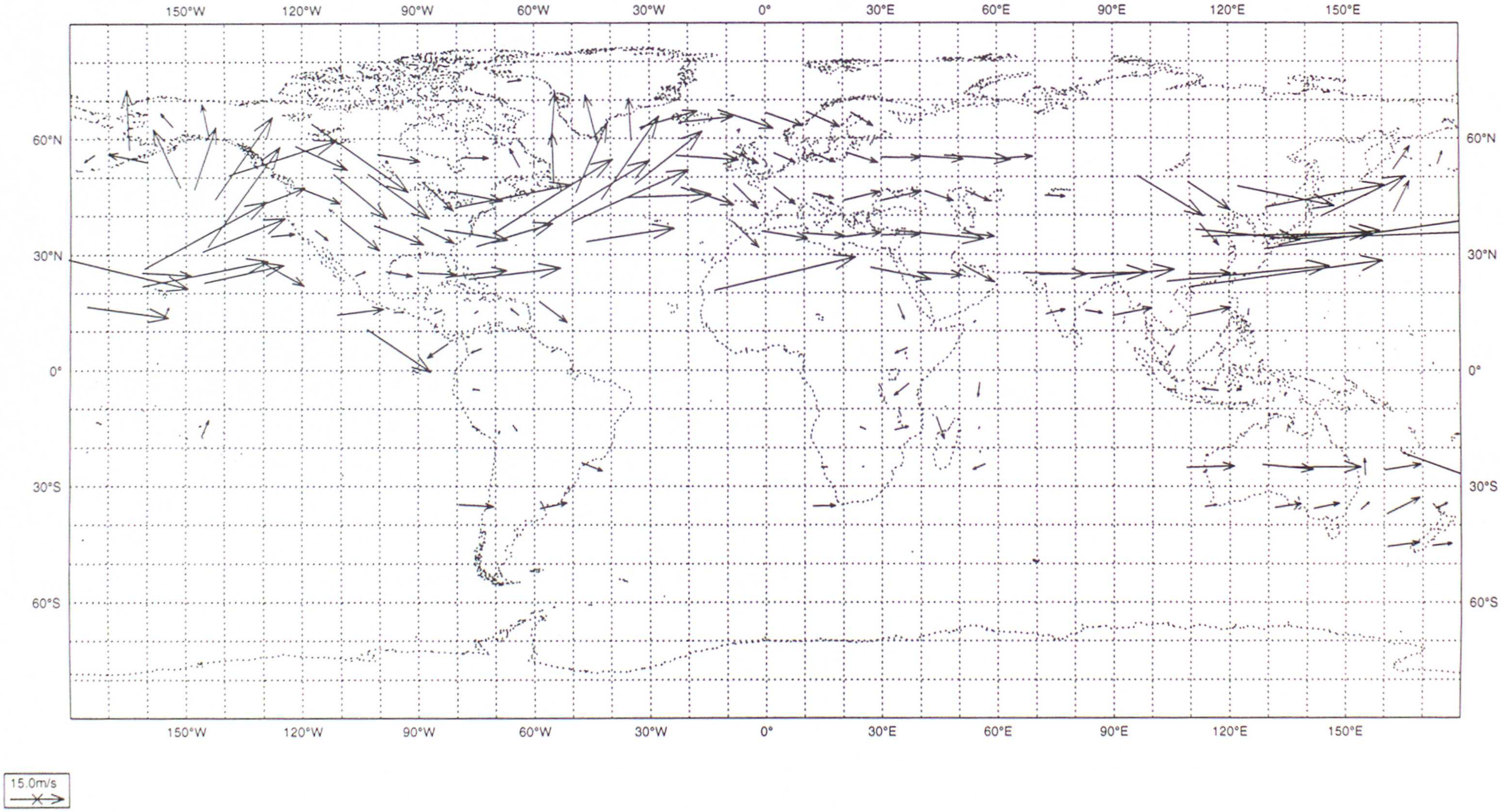

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

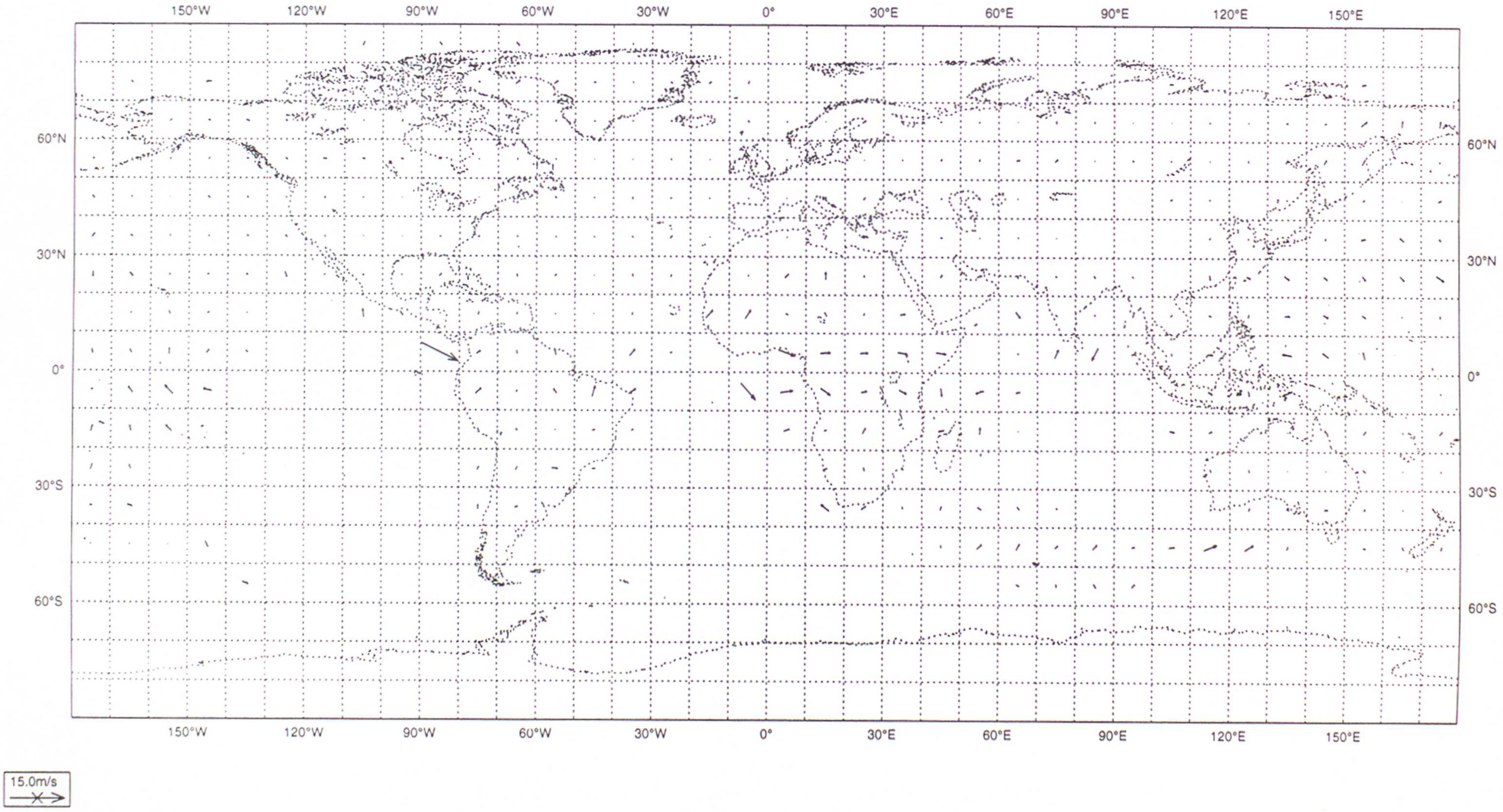

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

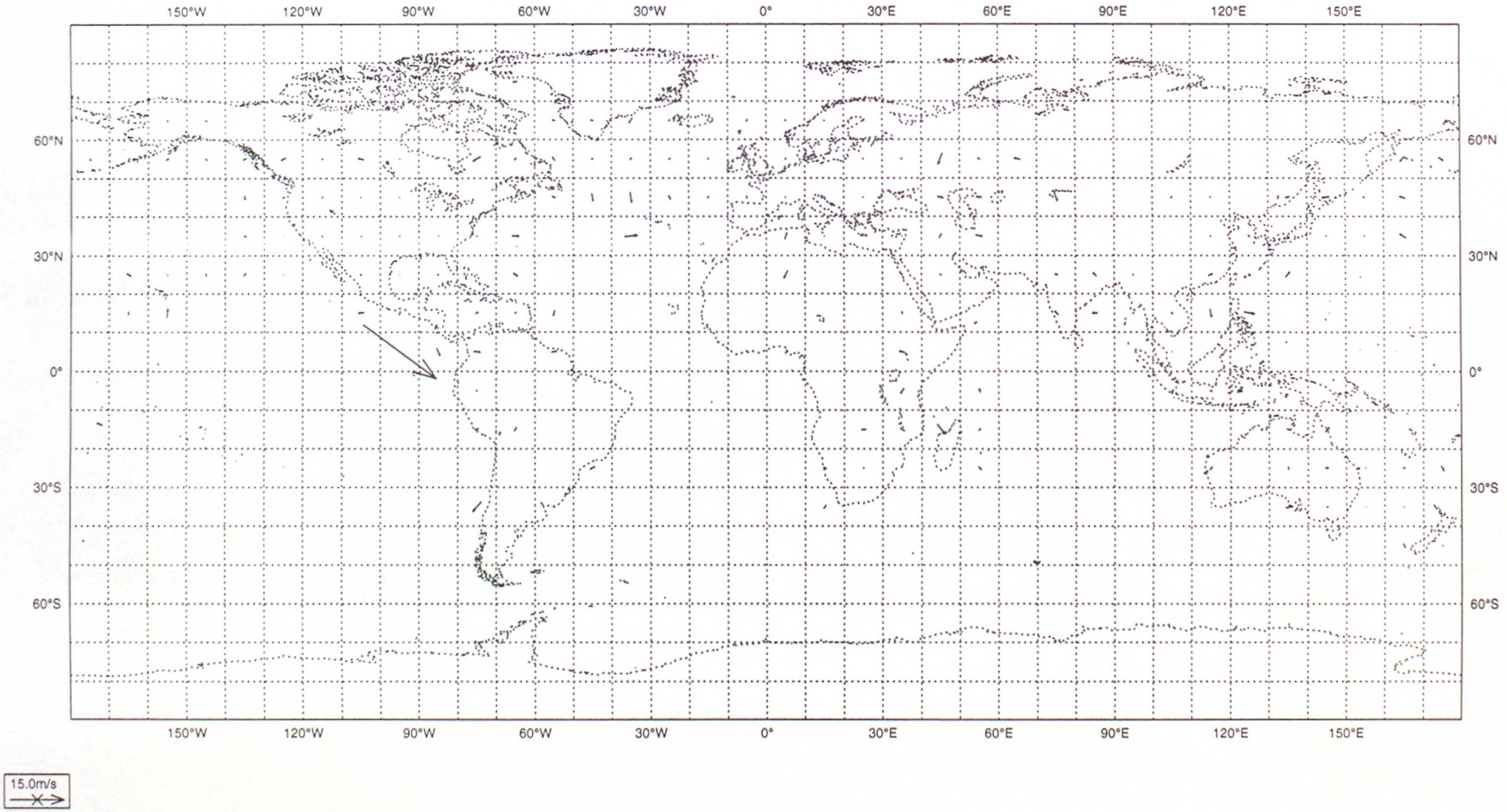

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

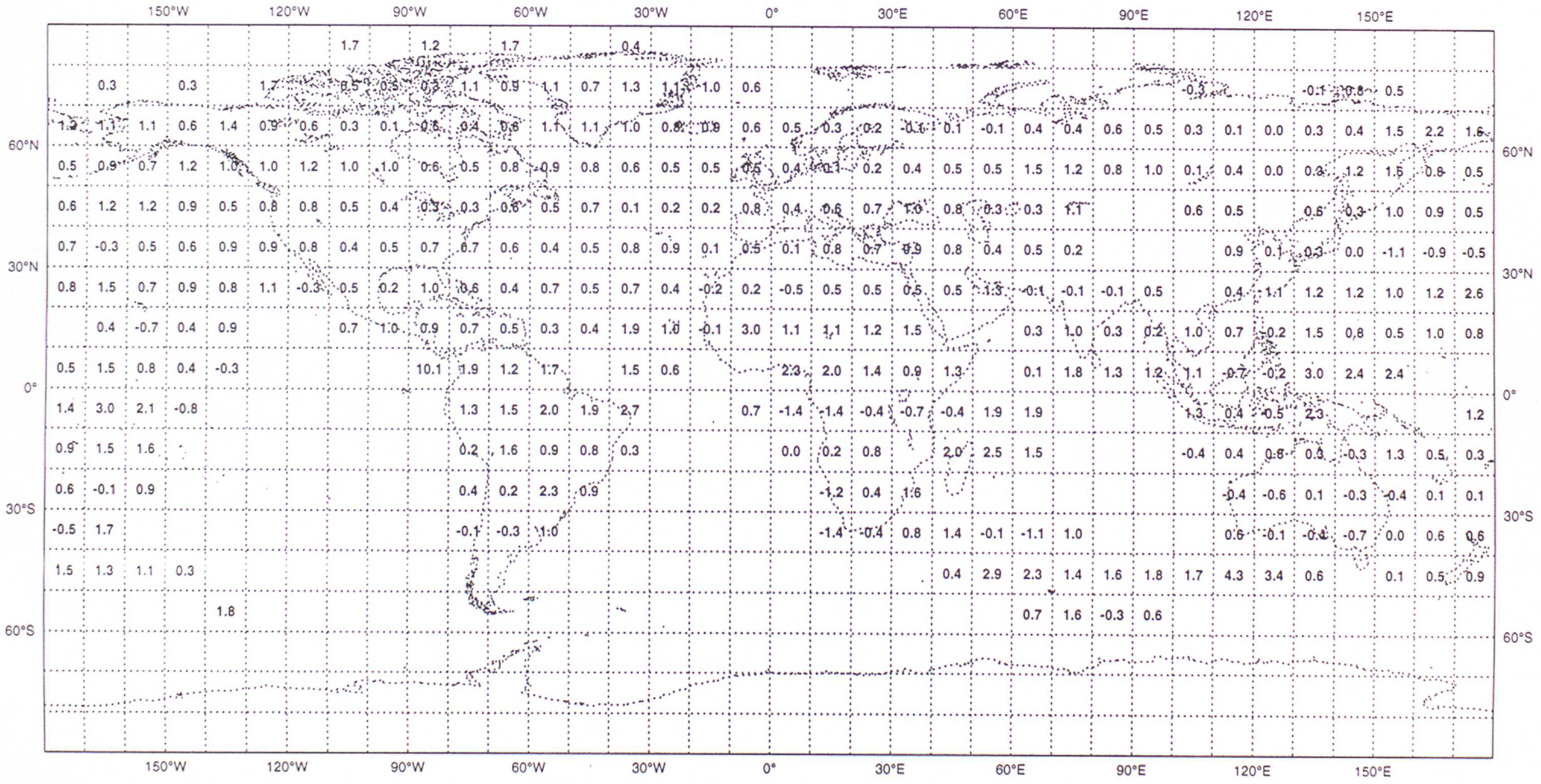

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
1.7 1.2 1.7 0.4
0.3 0.3 1.7 0.5 0.5 0.3 1.1 0.9 1.1 0.7 1.3 1.1 1.0 0.6 -0.3 -0.1 0.8 0.5
1.3 1.1 1.1 0.6 1.4 0.9 0.6 0.3 0.1 0.6 0.4 0.6 1.1 1.1 1.0 0.8 0.9 0.6 0.5 0.3 0.2 0.1 0.1 -0.1 0.4 0.4 0.6 0.5 0.3 0.1 0.0 0.3 0.4 1.5 2.2 1.6
0.5 0.9 0.7 1.2 1.0 1.0 1.2 1.0 1.0 0.6 0.5 0.8 0.9 0.8 0.6 0.5 0.5 0.5 0.4 0.1 0.2 0.4 0.5 0.5 1.5 1.2 0.8 1.0 0.1 0.4 0.0 0.3 1.2 1.6 0.8 0.5
0.6 1.2 1.2 0.9 0.5 0.8 0.8 0.5 0.4 0.3 0.3 0.6 0.5 0.7 0.1 0.2 0.2 0.8 0.4 0.6 0.7 1.0 0.8 0.3 0.3 1.1 0.6 0.5 0.6 0.3 1.0 0.9 0.5
0.7 -0.3 0.5 0.6 0.9 0.9 0.8 0.4 0.5 0.7 0.7 0.6 0.4 0.5 0.8 0.9 0.1 0.5 0.1 0.8 0.7 0.9 0.8 0.4 0.5 0.2 0.9 0.1 0.3 0.0 -1.1 -0.9 -0.5
0.8 1.5 0.7 0.9 0.8 1.1 -0.3 0.5 0.2 1.0 0.6 0.4 0.7 0.5 0.7 0.4 -0.2 0.2 -0.5 0.5 0.5 0.5 0.5 1.3 -0.1 -0.1 -0.1 0.5 0.4 1.1 1.2 1.2 1.0 1.2 2.6
0.4 -0.7 0.4 0.9 0.7 1.0 0.9 0.7 0.5 0.3 0.4 1.9 1.0 -0.1 3.0 1.1 1.1 1.2 1.5 0.3 1.0 0.3 0.2 1.0 0.7 0.2 1.5 0.8 0.5 1.0 0.8
0.5 1.5 0.8 0.4 -0.3 10.1 1.9 1.2 1.7 1.5 0.6 2.3 2.0 1.4 0.9 1.3 0.1 1.8 1.3 1.2 1.1 -0.7 -0.2 3.0 2.4 2.4
1.4 3.0 2.1 -0.8 1.3 1.5 2.0 1.9 2.7 0.7 -1.4 -1.4 -0.4 -0.7 -0.4 1.9 1.9 1.3 0.4 -0.5 2.3 1.2
0.9 1.5 1.6 0.2 1.6 0.9 0.8 0.3 0.0 0.2 0.8 2.0 2.5 1.5 -0.4 0.4 0.8 0.3 -0.3 1.3 0.5 0.3
0.6 -0.1 0.9 0.4 0.2 2.3 0.9 -1.2 0.4 1.6 -0.4 -0.6 0.1 -0.3 -0.4 0.1 0.1
-0.5 1.7 -0.1 -0.3 1.0 -1.4 -0.4 0.8 1.4 -0.1 -1.1 1.0 0.6 -0.1 -0.4 -0.7 0.0 0.6 0.6
1.5 1.3 1.1 0.3 0.4 2.9 2.3 1.4 1.6 1.8 1.7 4.3 3.4 0.6 0.1 0.5 0.9
1.8 0.7 1.6 -0.3 0.6

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

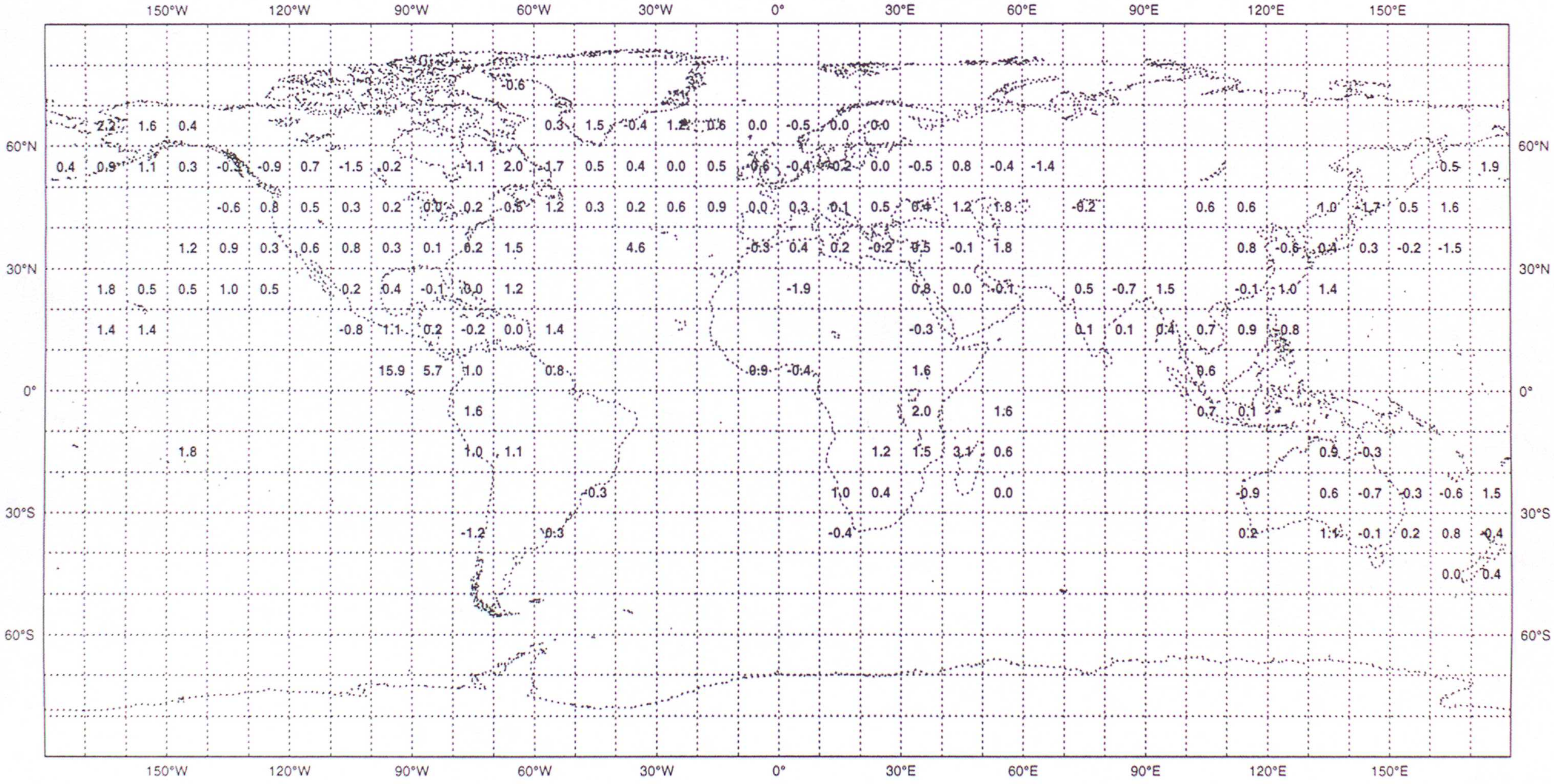

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-0.6
2.2 1.6 0.4 0.3 1.5 -0.4 1.2 0.6 0.0 -0.5 0.0 0.0
0.4 0.9 1.1 0.3 -0.3 -0.9 0.7 -1.5 0.2 -1.1 2.0 -1.7 0.5 0.4 0.0 0.5 -0.6 -0.4 -0.2 0.0 -0.5 0.8 -0.4 -1.4 0.5 1.9
-0.6 0.8 0.5 0.3 0.2 0.0 0.2 0.5 1.2 0.3 0.2 0.6 0.9 0.0 0.3 0.1 0.5 0.4 1.2 1.8 -0.2 0.6 0.6 1.0 -1.7 0.5 1.6
1.2 0.9 0.3 0.6 0.8 0.3 0.1 0.2 1.5 4.6 -0.3 0.4 0.2 -0.2 0.5 -0.1 1.8 0.8 -0.6 0.4 0.3 -0.2 -1.5
1.8 0.5 0.5 1.0 0.5 -0.2 0.4 -0.1 0.0 1.2 -1.9 0.8 0.0 -0.1 0.5 -0.7 1.5 -0.1 -1.0 1.4
1.4 1.4 -0.8 1.1 0.2 -0.2 0.0 1.4 -0.3 0.1 0.1 0.4 0.7 0.9 -0.8
15.9 5.7 1.0 0.8 0.9 -0.4 1.6 0.6
1.6 2.0 1.6 0.7 0.1
1.8 1.0 1.1 1.2 1.5 3.1 0.6 0.9 -0.3
-0.3 1.0 0.4 0.0 -0.9 0.6 -0.7 -0.3 -0.6 1.5
-1.2 0.3 -0.4 0.2 1.1 -0.1 0.2 0.8 -0.4
0.0 0.4
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

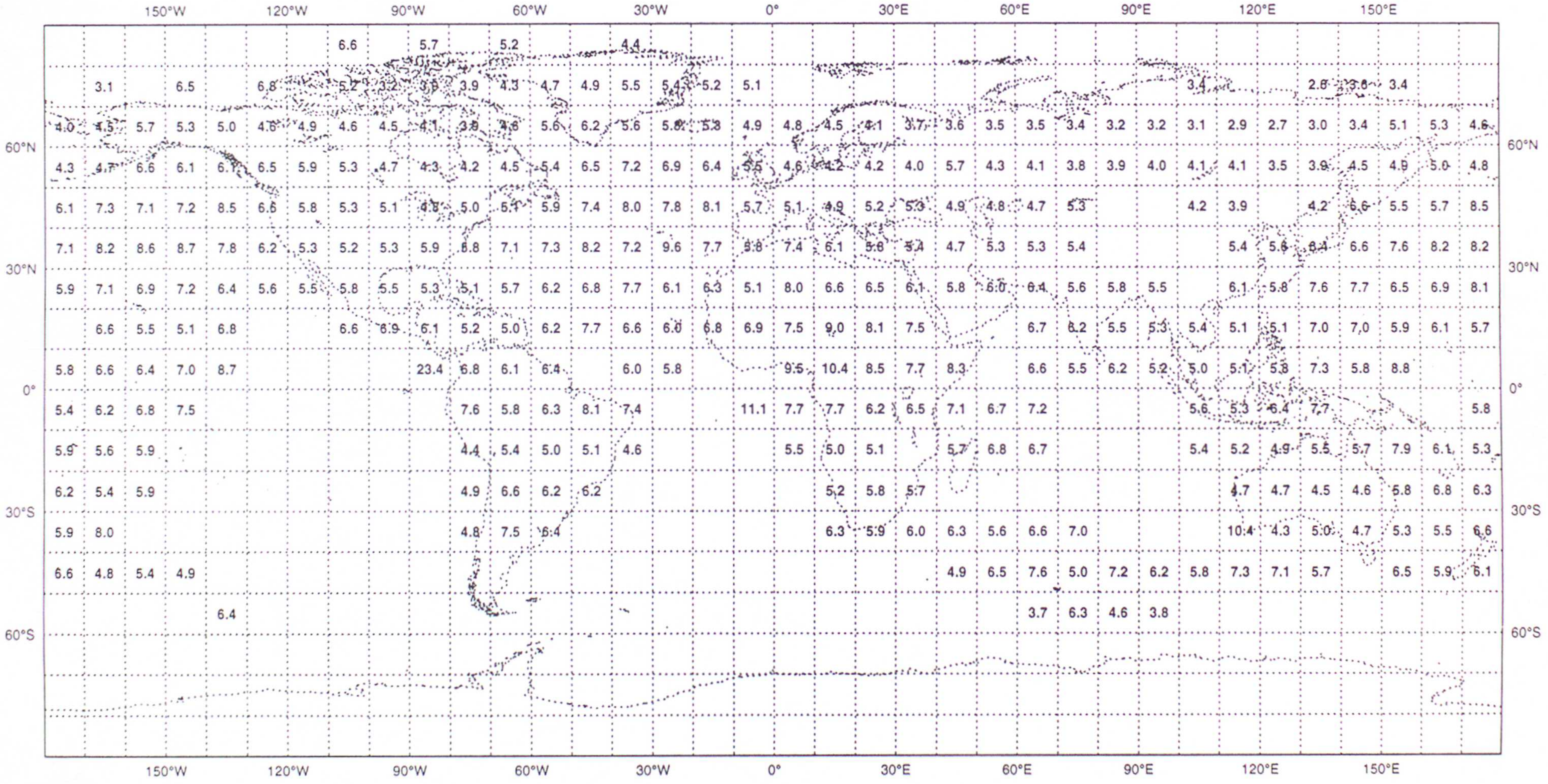
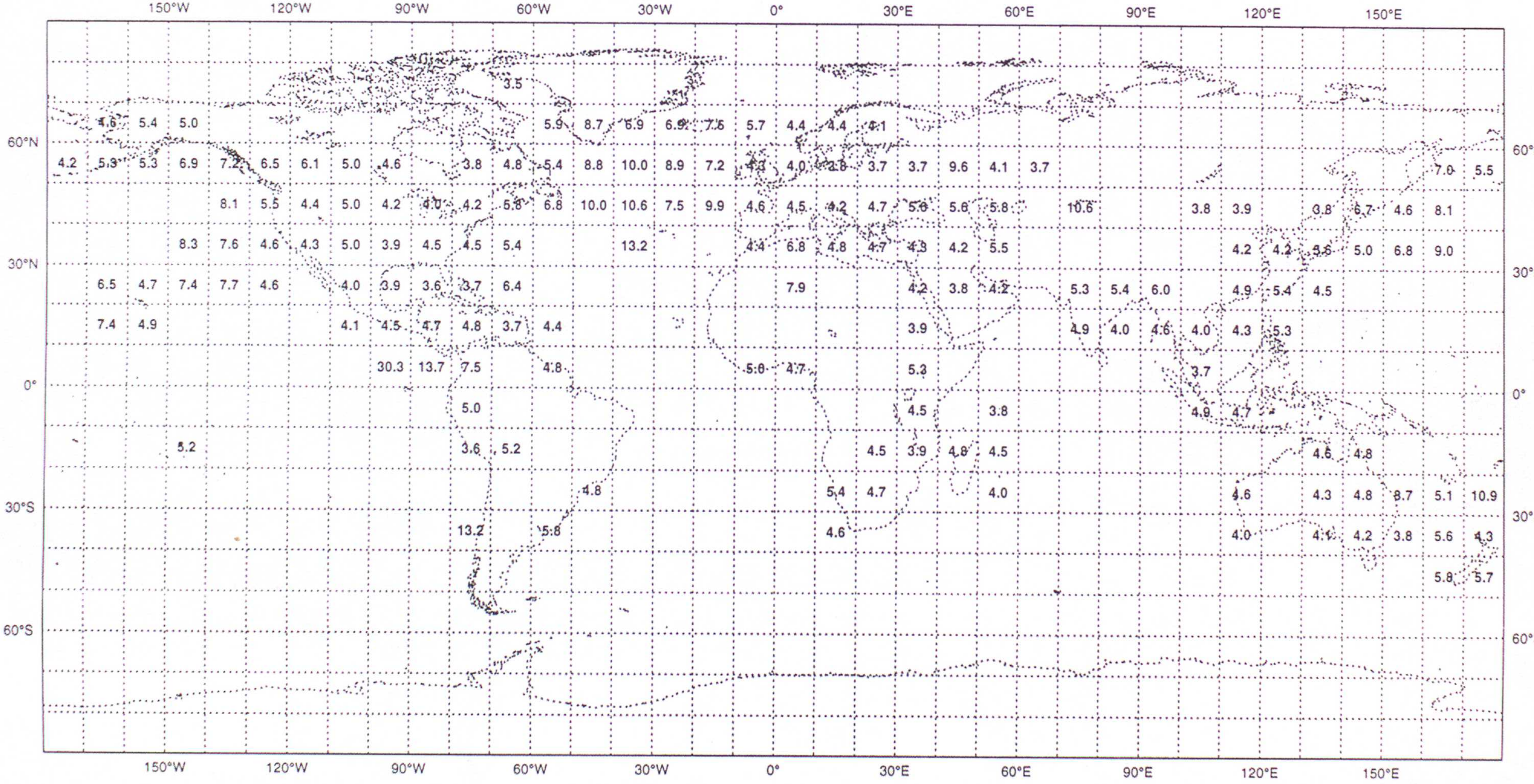

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
6.6 5.7 5.2 4.4
3.1 6.5 6.8 5.2 3.2 3.9 3.9 4.3 4.7 4.9 5.5 5.4 5.2 5.1 3.4 2.8 3.8 3.4
4.0 4.5 5.7 5.3 5.0 4.6 4.9 4.6 4.5 4.1 3.8 4.6 5.6 6.2 5.6 5.8 5.8 4.9 4.8 4.5 4.1 3.7 3.6 3.5 3.5 3.4 3.2 3.2 3.1 2.9 2.7 3.0 3.4 5.1 5.3 4.6
4.3 4.7 6.6 6.1 6.7 6.5 5.9 5.3 4.7 4.3 4.2 4.5 5.4 6.5 7.2 6.9 6.4 5.5 4.6 4.2 4.2 4.0 5.7 4.3 4.1 3.8 3.9 4.0 4.1 4.1 3.5 3.9 4.5 4.9 5.0 4.8
6.1 7.3 7.1 7.2 8.5 6.6 5.8 5.3 5.1 4.8 5.0 5.1 5.9 7.4 8.0 7.8 8.1 5.7 5.1 4.9 5.2 5.3 4.9 4.8 4.7 5.3 4.2 3.9 4.2 6.6 5.5 5.7 8.5
7.1 8.2 8.6 8.7 7.8 6.2 5.3 5.2 5.3 5.9 6.8 7.1 7.3 8.2 7.2 9.6 7.7 5.8 7.4 6.1 5.6 5.4 4.7 5.3 5.3 5.4 5.4 5.6 8.4 6.6 7.6 8.2 8.2
5.9 7.1 6.9 7.2 6.4 5.6 5.5 5.8 5.5 5.3 5.1 5.7 6.2 6.8 7.7 6.1 6.3 5.1 8.0 6.6 6.5 6.1 5.8 6.0 6.4 5.6 5.8 5.5 6.1 5.8 7.6 7.7 6.5 6.9 8.1
6.6 5.5 5.1 6.8 6.6 6.9 6.1 5.2 5.0 6.2 7.7 6.6 6.0 6.8 6.9 7.5 9.0 8.1 7.5 6.7 6.2 5.5 5.3 5.4 5.1 5.1 7.0 7.0 5.9 6.1 5.7
5.8 6.6 6.4 7.0 8.7 23.4 6.8 6.1 6.4 6.0 5.8 9.5 10.4 8.5 7.7 8.3 6.6 5.5 6.2 5.2 5.0 5.1 5.8 7.3 5.8 8.8
5.4 6.2 6.8 7.5 7.6 5.8 6.3 8.1 7.4 11.1 7.7 7.7 6.2 6.5 7.1 6.7 7.2 5.6 5.3 6.4 7.7 5.8
5.9 5.6 5.9 4.4 5.4 5.0 5.1 4.6 5.5 5.0 5.1 5.7 6.8 6.7 5.4 5.2 4.9 5.5 5.7 7.9 6.1 5.3
6.2 5.4 5.9 4.9 6.6 6.2 6.2 5.2 5.8 5.7 4.7 4.7 4.5 4.6 5.8 6.8 6.3
5.9 8.0 4.8 7.5 6.4 6.3 5.9 6.0 6.3 5.6 6.6 7.0 10.4 4.3 5.0 4.7 5.3 5.5 6.6
6.6 4.8 5.4 4.9 4.9 6.5 7.6 5.0 7.2 6.2 5.8 7.3 7.1 5.7 6.5 5.9 6.1
6.4 3.7 6.3 4.6 3.8

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). JANUARY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present


150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
3.5
4.6 5.4 5.0 5.9 8.7 6.9 6.9 7.5 5.7 4.4 4.4 4.1
4.2 5.3 5.3 6.9 7.2 6.5 6.1 5.0 4.6 3.8 4.8 5.4 8.8 10.0 8.9 7.2 4.3 4.0 3.8 3.7 3.7 9.6 4.1 3.7 7.0 5.5
8.1 5.5 4.4 5.0 4.2 4.0 4.2 5.8 6.8 10.0 10.6 7.5 9.9 4.6 4.5 4.2 4.7 5.6 5.6 5.8 10.6 3.8 3.9 3.8 6.7 4.6 8.1
8.3 7.6 4.6 4.3 5.0 3.9 4.5 4.5 5.4 13.2 4.4 6.8 4.8 4.7 4.3 4.2 5.5 4.2 4.2 5.6 5.0 6.8 9.0
6.5 4.7 7.4 7.7 4.6 4.0 3.9 3.6 3.7 6.4 7.9 4.2 3.8 4.2 5.3 5.4 6.0 4.9 5.4 4.5
7.4 4.9 4.1 4.5 4.7 4.8 3.7 4.4 3.9 4.9 4.0 4.6 4.0 4.3 5.3
30.3 13.7 7.5 4.8 5.6 4.7 5.3 3.7
5.0 4.5 3.8 4.9 4.7
5.2 3.6 5.2 4.5 3.9 4.8 4.5 4.6 4.8
4.8 5.4 4.7 4.0 4.6 4.3 4.8 8.7 5.1 10.9
13.2 5.8 4.6 4.0 4.1 4.2 3.8 5.6 4.3
5.8 5.7

## TABLE 5

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

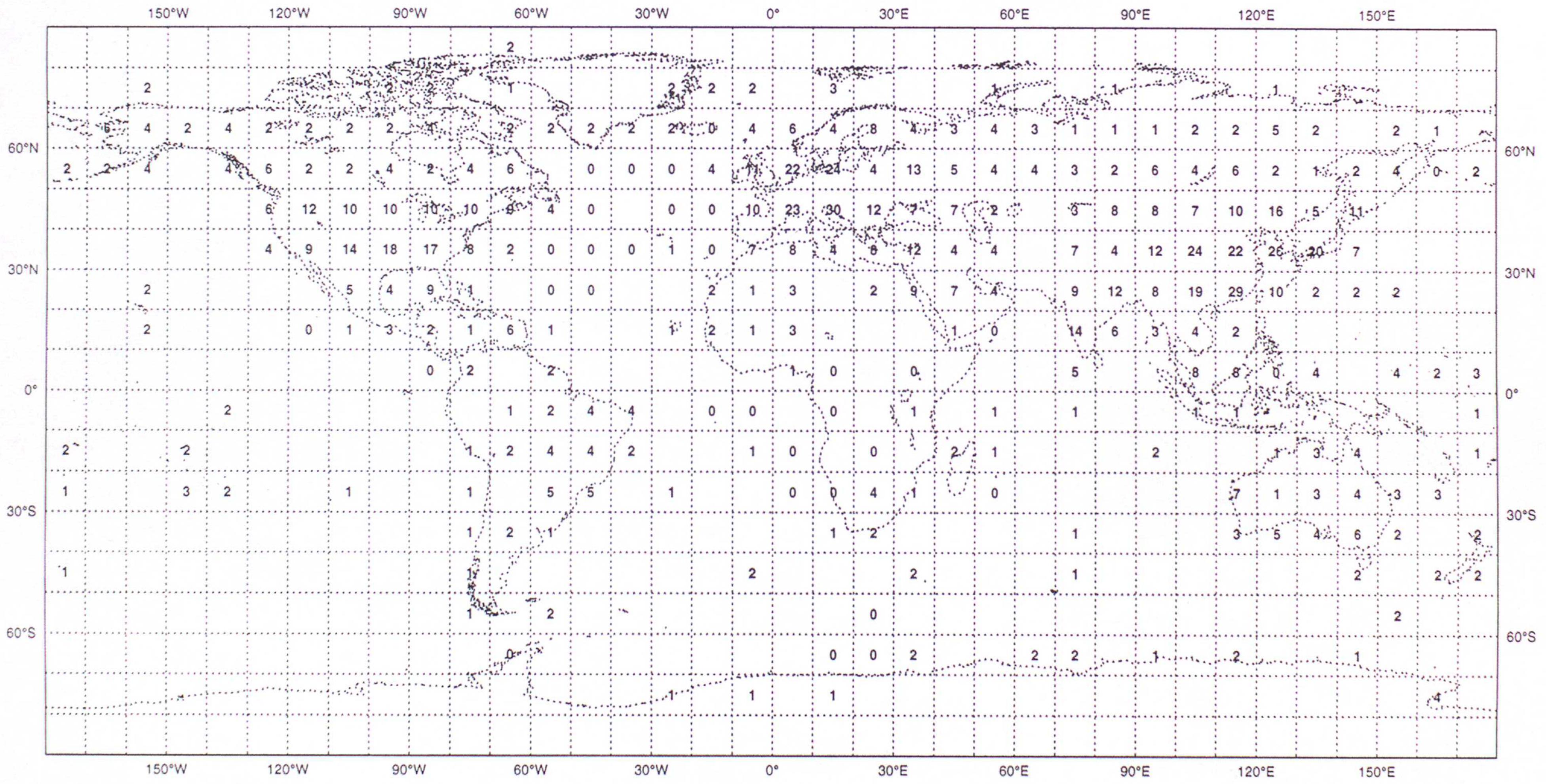
**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 1000.0 - 30.0 hPa |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT IN metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :% REJ | :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |
| | :NUM LEVELS | :Number of levels satisfying selection criteria. |
| **GROSS ERROR LIMITS** | :Defined in Appendix I.1 | |
| **SELECTION CRITERIA** | : ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS. | |

**ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS**

| WMO IDENT | OBS TIME | ELM | LEV | LAT/LONG | NUM OBS | NUM GROSS | SD | BIAS | RMS | NUM LEVELS |
|---|---|---|---|---|---|---|---|---|---|---|
| 26477 | 12 | Z | 1000 | 56/ 31 | 13 | 7 | 33.6 | -44.8 | 55.9 | 5 |
| 42027 | 12 | Z | 250 | 34/ 75 | 17 | 0 | 53.3 | 70.5 | 88.4 | 6 |
| 42101 | 00 | Z | 150 | 30/ 76 | 25 | 0 | 53.2 | -121.2 | 132.4 | 5 |
| 42182 | 00 | Z | 1000 | 29/ 77 | 22 | 7 | 15.8 | -61.3 | 63.3 | 6 |
| 42339 | 00 | Z | 1000 | 26/ 73 | 17 | 10 | 9.8 | -84.7 | 85.3 | 6 |
| 42339 | 12 | Z | 1000 | 26/ 73 | 5 | 23 | 3.9 | -95.6 | 95.7 | 6 |
| 42410 | 00 | Z | 1000 | 26/ 92 | 22 | 6 | 14.5 | -72.8 | 74.3 | 4 |
| 42410 | 12 | Z | 1000 | 26/ 92 | 14 | 7 | 10.3 | -80.6 | 81.3 | 4 |
| 42492 | 00 | Z | 250 | 26/ 85 | 27 | 1 | 60.4 | -44.0 | 74.7 | 4 |
| 42667 | 12 | Z | 70 | 23/ 77 | 13 | 0 | 126.1 | 78.9 | 148.7 | 4 |
| 42701 | 00 | Z | 150 | 23/ 85 | 20 | 0 | 94.8 | -32.3 | 100.1 | 4 |
| 42701 | 12 | Z | 100 | 23/ 85 | 13 | 0 | 79.6 | -109.0 | 135.0 | 5 |
| 42809 | 12 | Z | 200 | 23/ 88 | 25 | 0 | 67.4 | -62.0 | 91.6 | 4 |
| 42867 | 00 | Z | 150 | 21/ 79 | 19 | 0 | 98.1 | -70.9 | 121.1 | 6 |
| 42971 | 00 | Z | 30 | 20/ 86 | 14 | 0 | 82.2 | 214.7 | 229.9 | 4 |
| 43003 | 00 | Z | 150 | 19/ 73 | 27 | 0 | 103.6 | -115.3 | 155.0 | 8 |
| 43003 | 12 | Z | 1000 | 19/ 73 | 30 | 0 | 12.8 | -51.7 | 53.3 | 6 |
| 43014 | 00 | Z | 200 | 20/ 75 | 9 | 3 | 121.2 | -120.2 | 170.7 | 6 |
| 43014 | 12 | Z | 200 | 20/ 75 | 12 | 0 | 115.5 | -42.7 | 123.1 | 6 |
| 43192 | 00 | Z | 1000 | 15/ 74 | 18 | 8 | 5.4 | -91.2 | 91.4 | 8 |
| 43279 | 00 | Z | 50 | 13/ 80 | 18 | 0 | 104.5 | 125.4 | 163.3 | 5 |
| 43285 | 12 | Z | 50 | 13/ 75 | 18 | 0 | 80.6 | 164.8 | 183.5 | 4 |
| 43295 | 00 | Z | 70 | 13/ 78 | 9 | 0 | 90.0 | 135.4 | 162.6 | 4 |
| 43311 | 00 | Z | 200 | 11/ 73 | 16 | 3 | 42.9 | -106.4 | 114.7 | 4 |
| 43346 | 12 | Z | 30 | 11/ 80 | 14 | 0 | 89.8 | 248.9 | 264.6 | 4 |
| 43369 | 00 | Z | 250 | 8/ 73 | 18 | 0 | 73.6 | 65.3 | 98.4 | 5 |
| 43369 | 12 | Z | 150 | 8/ 73 | 10 | 5 | 96.4 | 117.8 | 152.2 | 7 |
| 43371 | 00 | Z | 150 | 8/ 77 | 27 | 1 | 99.7 | -120.3 | 156.2 | 8 |
| 43371 | 12 | Z | 30 | 8/ 77 | 12 | 0 | 104.5 | 213.6 | 237.8 | 4 |
| 43466 | 12 | Z | 300 | 7/ 80 | 2 | 0 | 85.0 | -6.0 | 85.2 | 4 |
| 61967 | 00 | Z | 1000 | -7/ 72 | 18 | 0 | 34.5 | 68.5 | 76.7 | 7 |
| 61967 | 12 | Z | 1000 | -7/ 72 | 17 | 0 | 31.3 | 75.9 | 82.1 | 9 |
| 61995 | 00 | Z | 200 | -20/ 58 | 1 | 0 | 0.0 | 191.0 | 191.0 | 5 |
| 83746 | 12 | Z | 1000 | -23/ -43 | 4 | 25 | 2.9 | -95.8 | 95.8 | 5 |
| 84628 | 12 | Z | 850 | -12/ -77 | 9 | 0 | 5.1 | -50.8 | 51.0 | 4 |
| 91366 | 00 | Z | 30 | 9/ 168 | 27 | 2 | 148.4 | 242.0 | 283.9 | 4 |
| 96163 | 00 | Z | 1000 | -1/ 100 | 11 | 4 | 6.0 | -86.7 | 86.9 | 6 |

Figure 8. TEMP 500 hPa geopotential mean daily count. JANUARY 2003
All hours
Global average number of observations in 24 hours = 1140


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

## TABLE 6

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

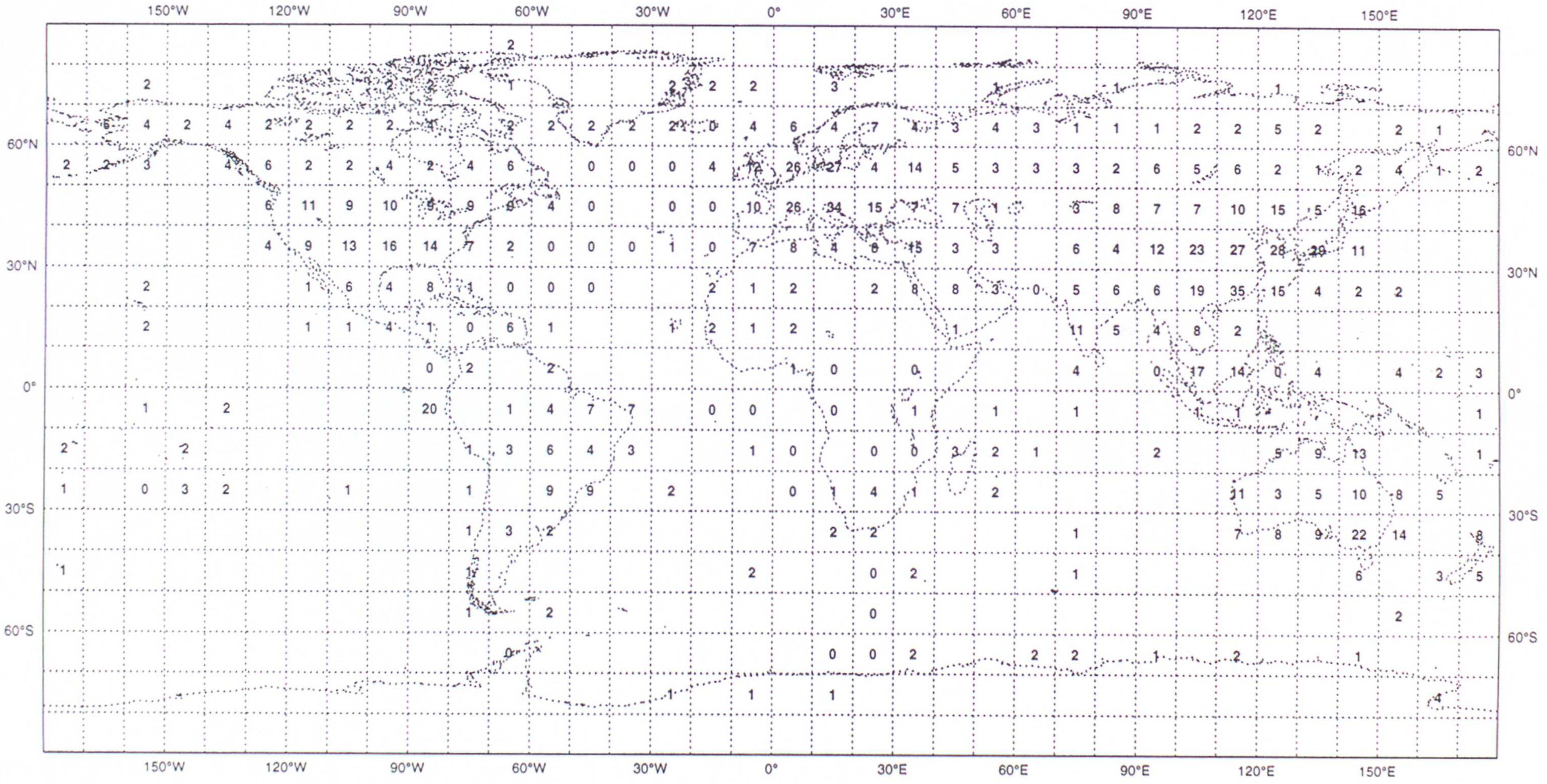
### Monitoring procedures

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 1000.0 - 100.0 hPa |
| **Element monitored** | | :VECTOR WIND in $m\ s^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :% REJ | :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors. |
| | :UBIAS,VBIAS | :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |
| | :NUM LEVELS | :Number of levels satisfying selection criteria. |
| **GROSS ERROR LIMITS** | :Defined in Appendix I.2 | |
| **SELECTION CRITERIA** | : ≥ 10 observations and ≥ 15 $m\ s^{-1}$ RMS vector wind. | |

**ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN**

| WMO IDENT | OBS TIME | ELM | LEV | LAT/LONG | NUM OBS | NUM GROSS | % REJ | UBIAS | VBIAS | RMS | LEVELS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PSPIU | 00 | V | 150 | -5/ -81 | 27 | 0 | 100 | -1.0 | -3.0 | 22.1 | 3 |
| PSPIU | 12 | V | 100 | -5/ -81 | 22 | 0 | 100 | -3.4 | -0.1 | 26.3 | 4 |
| 02527 | 12 | V | 150 | 58/ 12 | 27 | 0 | 3 | -3.5 | 0.8 | 15.8 | 1 |
| 17030 | 12 | V | 200 | 41/ 36 | 29 | 0 | 68 | -2.5 | -2.5 | 15.4 | 1 |
| 17240 | 12 | V | 250 | 38/ 31 | 27 | 0 | 100 | -7.3 | 1.8 | 15.8 | 1 |
| 17351 | 00 | V | 200 | 37/ 35 | 30 | 0 | 100 | -11.8 | 4.8 | 19.7 | 4 |
| 17351 | 12 | V | 300 | 37/ 35 | 30 | 0 | 100 | -10.2 | 4.2 | 20.6 | 4 |
| 40582 | 12 | V | 250 | 29/ 48 | 19 | 0 | 10 | 0.4 | 0.0 | 17.0 | 1 |
| 41571 | 12 | V | 500 | 34/ 73 | 16 | 0 | 6 | -1.7 | -2.9 | 16.8 | 1 |
| 42101 | 00 | V | 200 | 30/ 76 | 27 | 1 | 3 | -4.4 | -5.5 | 17.9 | 1 |
| 42182 | 00 | V | 200 | 29/ 77 | 17 | 0 | 100 | -10.3 | -7.6 | 21.2 | 3 |
| 42182 | 12 | V | 250 | 29/ 77 | 23 | 0 | 100 | -10.7 | -7.6 | 18.2 | 3 |
| 42410 | 00 | V | 300 | 26/ 92 | 13 | 0 | 100 | 3.0 | 4.1 | 20.0 | 2 |
| 42410 | 12 | V | 400 | 26/ 92 | 16 | 0 | 100 | 3.9 | 8.7 | 16.5 | 1 |
| 42647 | 12 | V | 200 | 23/ 73 | 11 | 0 | 100 | 12.6 | 5.7 | 19.2 | 2 |
| 42701 | 00 | V | 200 | 23/ 85 | 11 | 0 | 27 | -6.6 | -9.1 | 23.3 | 2 |
| 43041 | 00 | V | 250 | 19/ 82 | 10 | 0 | 10 | 11.1 | 1.8 | 18.0 | 1 |
| 43128 | 12 | V | 150 | 17/ 78 | 20 | 0 | 5 | -5.8 | -1.4 | 27.2 | 1 |
| 52983 | 00 | V | 100 | 36/ 104 | 11 | 0 | 9 | -2.1 | 5.6 | 18.6 | 1 |
| 60360 | 12 | V | 200 | 37/ 8 | 11 | 0 | 100 | 7.2 | -6.9 | 23.6 | 2 |
| 60571 | 00 | V | 150 | 31/ -2 | 22 | 0 | 4 | -5.3 | 1.8 | 21.8 | 1 |
| 60620 | 12 | V | 250 | 28/ 0 | 12 | 0 | 100 | -18.2 | -3.2 | 29.1 | 4 |
| 60630 | 12 | V | 150 | 27/ 2 | 14 | 0 | 100 | -4.4 | -6.4 | 17.0 | 4 |
| 62337 | 00 | V | 250 | 31/ 34 | 28 | 0 | 100 | -7.3 | 11.7 | 16.6 | 2 |
| 62337 | 12 | V | 250 | 31/ 34 | 27 | 0 | 100 | -6.2 | 10.8 | 16.8 | 3 |
| 62378 | 00 | V | 200 | 30/ 31 | 26 | 1 | 100 | -13.4 | -1.5 | 20.5 | 4 |
| 62378 | 12 | V | 200 | 30/ 31 | 27 | 0 | 100 | -17.4 | -2.1 | 20.4 | 3 |
| 62423 | 00 | V | 150 | 27/ 28 | 19 | 0 | 26 | -13.1 | 0.6 | 20.0 | 4 |
| 62423 | 12 | V | 150 | 27/ 28 | 23 | 0 | 39 | -19.6 | -1.7 | 28.2 | 6 |
| 72208 | 12 | V | 200 | 33/ -80 | 19 | 0 | 10 | 0.8 | 4.8 | 17.8 | 1 |
| 72376 | 00 | V | 300 | 37/-108 | 30 | 0 | 23 | -2.2 | 0.7 | 17.8 | 2 |
| 72376 | 12 | V | 300 | 37/-108 | 26 | 0 | 34 | -5.0 | 6.0 | 15.7 | 1 |
| 78073 | 12 | V | 250 | 25/ -77 | 28 | 0 | 64 | -2.4 | 4.9 | 19.5 | 1 |
| 78397 | 12 | V | 250 | 18/ -77 | 10 | 0 | 20 | 6.1 | -11.5 | 26.6 | 1 |

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. JANUARY 2003
All hours
Global average number of observations in 24 hours = 1326


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

## TABLE 7

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from each unique identifier for radiosonde TEMPs. |
| **Area monitored** | | :90°N - 90°S, 180°W - 180°E. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :00 UTC and 12 UTC. |
| **Level(s) monitored** | | :Standard levels between 500.0 - 150.0 hPa |
| **Element monitored** | | :WIND DIRECTION in degrees |
| **Parameters monitored** | | |
| | :NUM OBS | :Average number of observations at all levels. |
| | :BIAS | :Mean difference of observations from background values from all levels. |
| | :MAX SPREAD | :(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels |
| | :SD | :SD of difference of observations from background values at all levels. |

**SELECTION CRITERIA** :NUM OBS $\geq 5$, and
ABSOLUTE BIAS $\geq 10°$, with
SD $< 30°$, and
MAX SPREAD $< 10°$

| WMO IDENT | OBS TIME | ELM | LAT/LONG | NUM OBS | BIAS | MAX SPREAD | SD |
|---|---|---|---|---|---|---|---|
| 10468 | 00 | DD | 52/ 12 | 28 | 14.2 | 1.0 | 9.6 |
| 10468 | 12 | DD | 52/ 12 | 24 | 14.5 | 3.9 | 10.6 |
| 29612 | 12 | DD | 55/ 78 | 28 | 22.6 | 2.1 | 6.2 |
| 60360 | 12 | DD | 37/ 8 | 11 | 11.0 | 4.9 | 19.7 |
| 60656 | 12 | DD | 28/ -8 | 24 | 11.7 | 6.9 | 24.6 |
| 62337 | 00 | DD | 31/ 34 | 27 | -17.3 | 4.2 | 7.9 |
| 62337 | 12 | DD | 31/ 34 | 26 | -16.1 | 3.2 | 7.7 |
| 91413 | 12 | DD | 9/ 138 | 22 | -10.9 | 6.2 | 24.0 |

# MONITORING OF SATELLITE WINDS

## MONITORING CENTRE: BRACKNELL

## MONTH: January 2003

**Monitoring procedures**

| | |
|---|---|
| **Period** | :One calendar month. |
| **Data monitored** | :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT. |
| **Standard of comparison** | :Background field from UKMO global model. |
| **Selection Criteria** | :number of observations > 10. |
| **Data Extracted** | :Layer 701 - 1000 hPa<br>401 - 700 hPa<br>101 - 400 hPa<br>:Mean wind<br>:Mean observation minus background vector wind differences<br>:Mean observation minus background speed differences<br>:RMS of observation minus background vector differences |

Figure 10. SATOB 701 - 1000 hPa mean daily count. JANUARY 2003
Global average number of observations in 24 hours = 89472

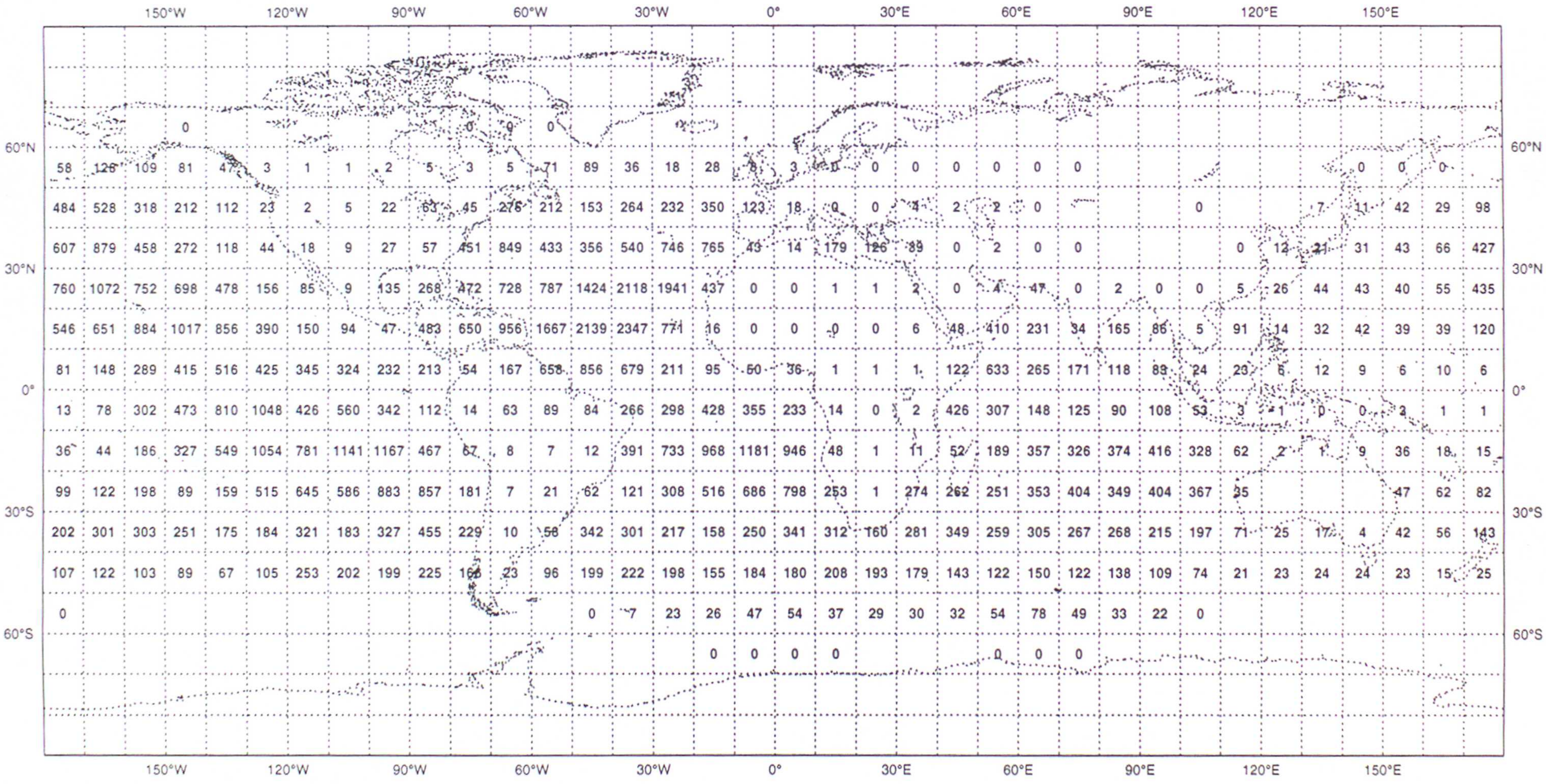

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0 0 0 0
58 126 109 81 47 3 1 1 2 5 3 5 71 89 36 18 28 8 3 0 0 0 0 0 0 0 0 0 0
484 528 318 212 112 23 2 5 22 63 45 276 212 153 264 232 350 123 18 0 0 4 2 2 0 0 7 11 42 29 98
607 879 458 272 118 44 18 9 27 57 451 849 433 356 540 746 765 43 14 179 126 89 0 2 0 0 0 12 21 31 43 66 427
760 1072 752 698 478 156 85 9 135 268 472 728 787 1424 2118 1941 437 0 0 1 1 2 0 4 47 0 2 0 0 5 26 44 43 40 55 435
546 651 884 1017 856 390 150 94 47 483 650 956 1667 2139 2347 771 16 0 0 0 0 6 48 410 231 34 165 86 5 91 14 32 42 39 39 120
81 148 289 415 516 425 345 324 232 213 54 167 658 856 679 211 95 50 36 1 1 1 122 633 265 171 118 83 24 23 6 12 9 6 10 6
13 78 302 473 810 1048 426 560 342 112 14 63 89 84 266 298 428 355 233 14 0 2 426 307 148 125 90 108 53 3 1 0 0 3 1 1
36 44 186 327 549 1054 781 1141 1167 467 67 8 7 12 391 733 968 1181 946 48 1 11 52 189 357 326 374 416 328 62 2 1 9 36 18 15
99 122 198 89 159 515 645 586 883 857 181 7 21 62 121 308 516 686 798 253 1 274 262 251 353 404 349 404 367 35 47 62 82
202 301 303 251 175 184 321 183 327 455 229 10 58 342 301 217 158 250 341 312 160 281 349 259 305 267 268 215 197 71 25 17 4 42 56 143
107 122 103 89 67 105 253 202 199 225 166 23 96 199 222 198 155 184 180 208 193 179 143 122 150 122 138 109 74 21 23 24 24 23 15 25
0 0 7 23 26 47 54 37 29 30 32 54 78 49 33 22 0
0 0 0 0 0 0 0
150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S

Figure 11. SATOB 701 - 1000 hPa vector mean wind. JANUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

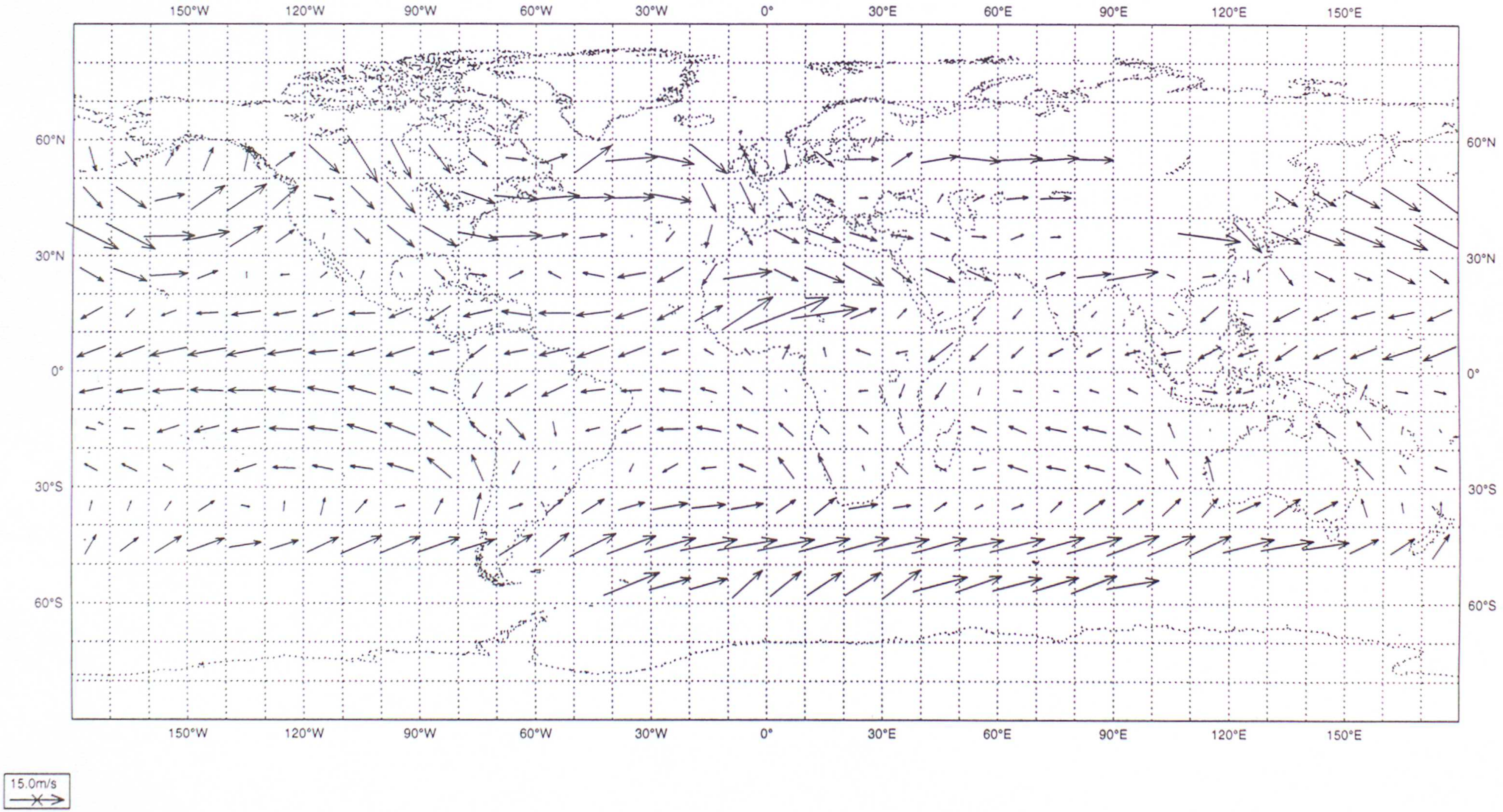

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. JANUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

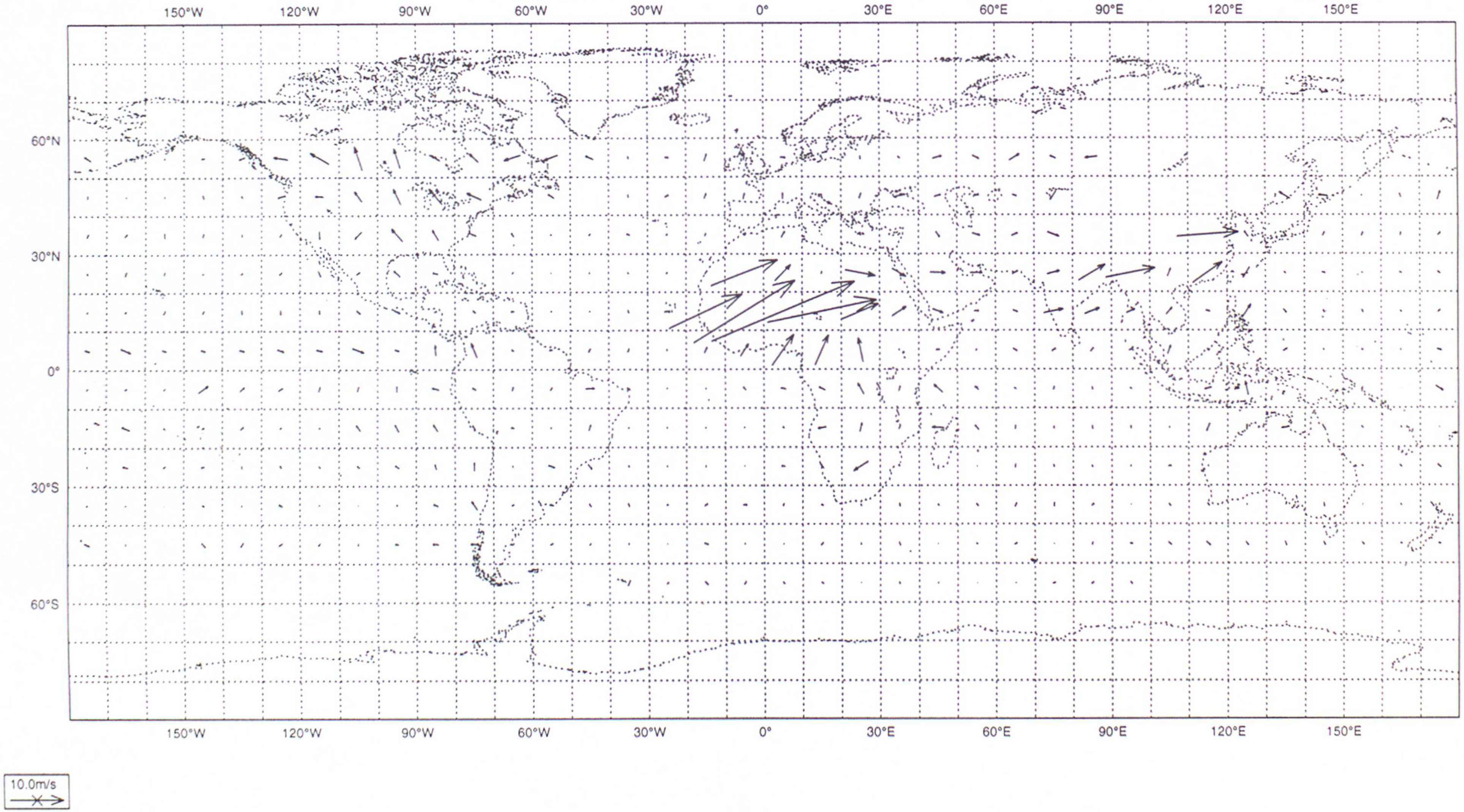

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). JANUARY 2003
All observations
Values are plotted where greater than 10 obs are present

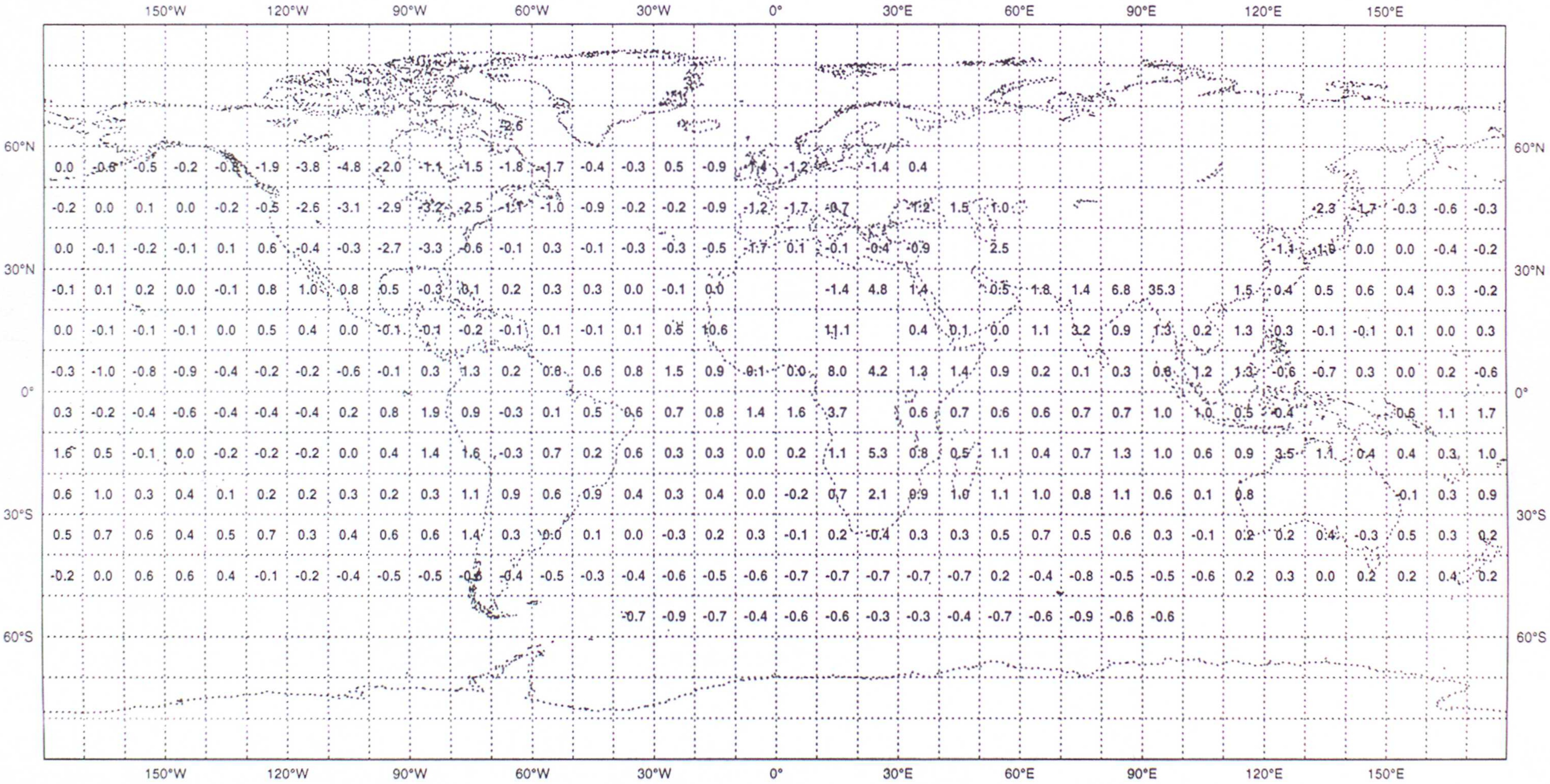

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
-2.6
0.0 -0.6 -0.5 -0.2 -0.8 -1.9 -3.8 -4.8 -2.0 -1.1 -1.5 -1.8 -1.7 -0.4 -0.3 0.5 -0.9 -1.4 -1.2 -1.4 0.4
-0.2 0.0 0.1 0.0 -0.2 -0.5 -2.6 -3.1 -2.9 -3.2 -2.5 -1.1 -1.0 -0.9 -0.2 -0.2 -0.9 -1.2 -1.7 -0.7 -1.2 1.5 1.0 -2.3 -1.7 -0.3 -0.6 -0.3
0.0 -0.1 -0.2 -0.1 0.1 0.6 -0.4 -0.3 -2.7 -3.3 -0.6 -0.1 0.3 -0.1 -0.3 -0.3 -0.5 -1.7 0.1 -0.1 -0.4 -0.9 2.5 -1.1 -1.0 0.0 0.0 -0.4 -0.2
-0.1 0.1 0.2 0.0 -0.1 0.8 1.0 0.8 0.5 -0.3 0.1 0.2 0.3 0.3 0.0 -0.1 0.0 -1.4 4.8 1.4 0.5 1.8 1.4 6.8 35.3 1.5 0.4 0.5 0.6 0.4 0.3 -0.2
0.0 -0.1 -0.1 -0.1 0.0 0.5 0.4 0.0 -0.1 -0.1 -0.2 -0.1 0.1 -0.1 0.1 0.5 10.6 11.1 0.4 0.1 0.0 1.1 3.2 0.9 1.3 0.2 1.3 0.3 -0.1 -0.1 0.1 0.0 0.3
-0.3 -1.0 -0.8 -0.9 -0.4 -0.2 -0.2 -0.6 -0.1 0.3 1.3 0.2 0.8 0.6 0.8 1.5 0.9 0.1 0.0 8.0 4.2 1.3 1.4 0.9 0.2 0.1 0.3 0.8 1.2 1.3 -0.6 -0.7 0.3 0.0 0.2 -0.6
0.3 -0.2 -0.4 -0.6 -0.4 -0.4 -0.4 0.2 0.8 1.9 0.9 -0.3 0.1 0.5 0.6 0.7 0.8 1.4 1.6 3.7 0.6 0.7 0.6 0.6 0.7 0.7 1.0 1.0 0.5 -0.4 0.6 1.1 1.7
1.6 0.5 -0.1 0.0 -0.2 -0.2 -0.2 0.0 0.4 1.4 1.6 -0.3 0.7 0.2 0.6 0.3 0.3 0.0 0.2 1.1 5.3 0.8 0.5 1.1 0.4 0.7 1.3 1.0 0.6 0.9 3.5 1.1 0.4 0.4 0.3 1.0
0.6 1.0 0.3 0.4 0.1 0.2 0.2 0.3 0.2 0.3 1.1 0.9 0.6 0.9 0.4 0.3 0.4 0.0 -0.2 0.7 2.1 0.9 1.0 1.1 1.0 0.8 1.1 0.6 0.1 0.8 -0.1 0.3 0.9
0.5 0.7 0.6 0.4 0.5 0.7 0.3 0.4 0.6 0.6 1.4 0.3 0.0 0.1 0.0 -0.3 0.2 0.3 -0.1 0.2 -0.4 0.3 0.3 0.5 0.7 0.5 0.6 0.3 -0.1 0.2 0.2 0.4 -0.3 0.5 0.3 0.2
-0.2 0.0 0.6 0.6 0.4 -0.1 -0.2 -0.4 -0.5 -0.5 -0.6 -0.4 -0.5 -0.3 -0.4 -0.6 -0.5 -0.6 -0.7 -0.7 -0.7 -0.7 -0.7 0.2 -0.4 -0.8 -0.5 -0.5 -0.6 0.2 0.3 0.0 0.2 0.2 0.4 0.2
-0.7 -0.9 -0.7 -0.4 -0.6 -0.6 -0.3 -0.3 -0.4 -0.7 -0.6 -0.9 -0.6 -0.6

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). JANUARY 2003
All observations
Values are plotted where greater than 10 obs are present

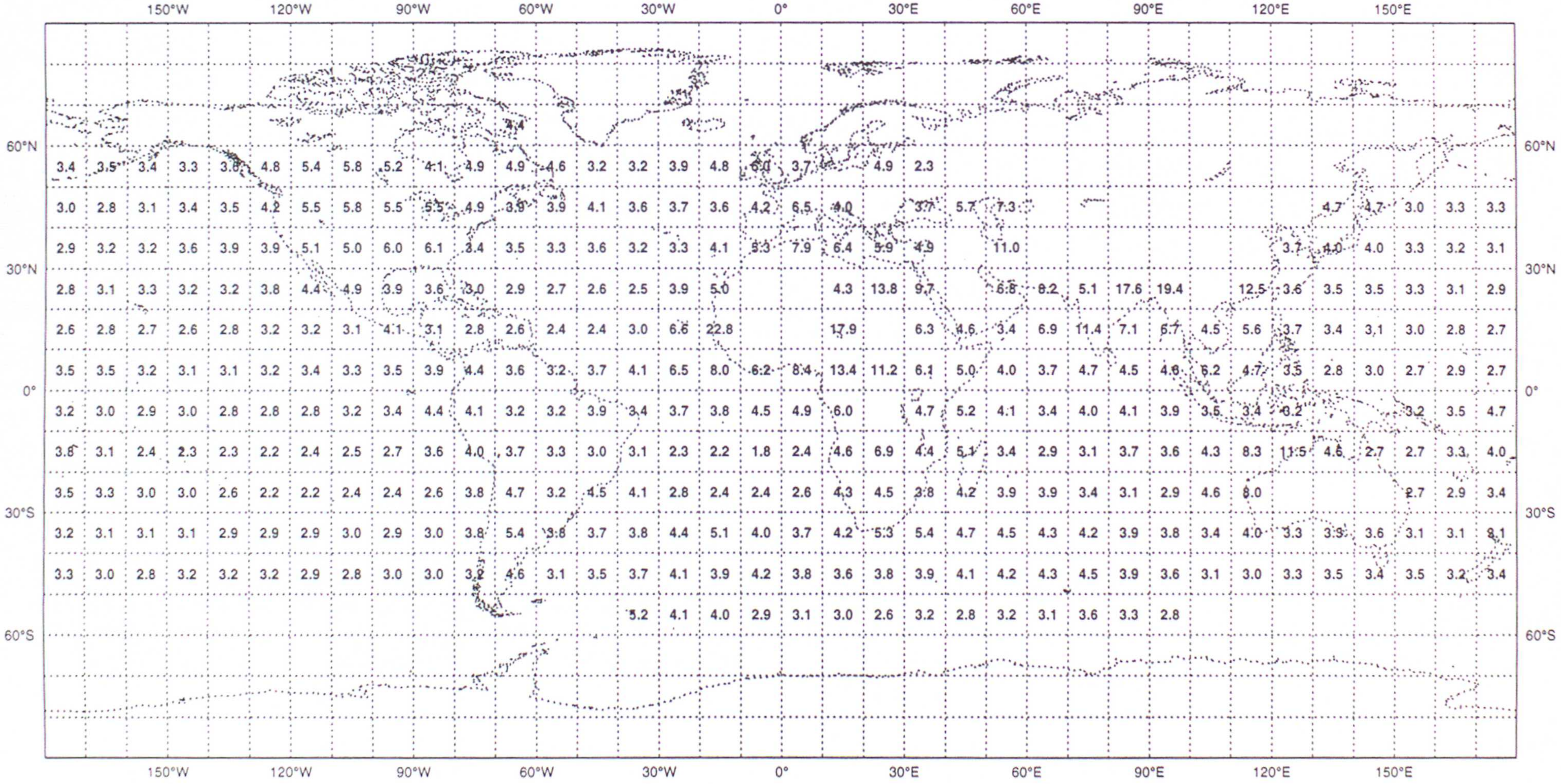

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
3.4 3.5 3.4 3.3 3.6 4.8 5.4 5.8 5.2 4.1 4.9 4.9 4.6 3.2 3.2 3.9 4.8 6.0 3.7 4.9 2.3
3.0 2.8 3.1 3.4 3.5 4.2 5.5 5.8 5.5 5.5 4.9 3.9 3.9 4.1 3.6 3.7 3.6 4.2 6.5 4.0 3.7 5.7 7.3 4.7 4.7 3.0 3.3 3.3
2.9 3.2 3.2 3.6 3.9 3.9 5.1 5.0 6.0 6.1 3.4 3.5 3.3 3.6 3.2 3.3 4.1 3.3 7.9 6.4 5.9 4.9 11.0 3.7 4.0 4.0 3.3 3.2 3.1
2.8 3.1 3.3 3.2 3.2 3.8 4.4 4.9 3.9 3.6 3.0 2.9 2.7 2.6 2.5 3.9 5.0 4.3 13.8 9.7 6.8 8.2 5.1 17.6 19.4 12.5 3.6 3.5 3.5 3.3 3.1 2.9
2.6 2.8 2.7 2.6 2.8 3.2 3.2 3.1 4.1 3.1 2.8 2.6 2.4 2.4 3.0 6.6 22.8 17.9 6.3 4.6 3.4 6.9 11.4 7.1 6.7 4.5 5.6 3.7 3.4 3.1 3.0 2.8 2.7
3.5 3.5 3.2 3.1 3.1 3.2 3.4 3.3 3.5 3.9 4.4 3.6 3.2 3.7 4.1 6.5 8.0 6.2 8.4 13.4 11.2 6.1 5.0 4.0 3.7 4.7 4.5 4.6 6.2 4.7 3.5 2.8 3.0 2.7 2.9 2.7
3.2 3.0 2.9 3.0 2.8 2.8 2.8 3.2 3.4 4.4 4.1 3.2 3.2 3.9 3.4 3.7 3.8 4.5 4.9 6.0 4.7 5.2 4.1 3.4 4.0 4.1 3.9 3.5 3.4 6.2 3.2 3.5 4.7
3.8 3.1 2.4 2.3 2.3 2.2 2.4 2.5 2.7 3.6 4.0 3.7 3.3 3.0 3.1 2.3 2.2 1.8 2.4 4.6 6.9 4.4 5.1 3.4 2.9 3.1 3.7 3.6 4.3 8.3 11.5 4.6 2.7 2.7 3.3 4.0
3.5 3.3 3.0 3.0 2.6 2.2 2.2 2.4 2.4 2.6 3.8 4.7 3.2 4.5 4.1 2.8 2.4 2.4 2.6 4.3 4.5 3.8 4.2 3.9 3.9 3.4 3.1 2.9 4.6 8.0 2.7 2.9 3.4
3.2 3.1 3.1 3.1 2.9 2.9 2.9 3.0 2.9 3.0 3.8 5.4 3.8 3.7 3.8 4.4 5.1 4.0 3.7 4.2 5.3 5.4 4.7 4.5 4.3 4.2 3.9 3.8 3.4 4.0 3.3 3.3 3.6 3.1 3.1 3.1
3.3 3.0 2.8 3.2 3.2 3.2 2.9 2.8 3.0 3.0 3.2 4.6 3.1 3.5 3.7 4.1 3.9 4.2 3.8 3.6 3.8 3.9 4.1 4.2 4.3 4.5 3.9 3.6 3.1 3.0 3.3 3.5 3.4 3.5 3.2 3.4
5.2 4.1 4.0 2.9 3.1 3.0 2.6 3.2 2.8 3.2 3.1 3.6 3.3 2.8

Figure 15. SATOB 401 - 700 hPa mean daily count. JANUARY 2003
Global average number of observations in 24 hours = 20132

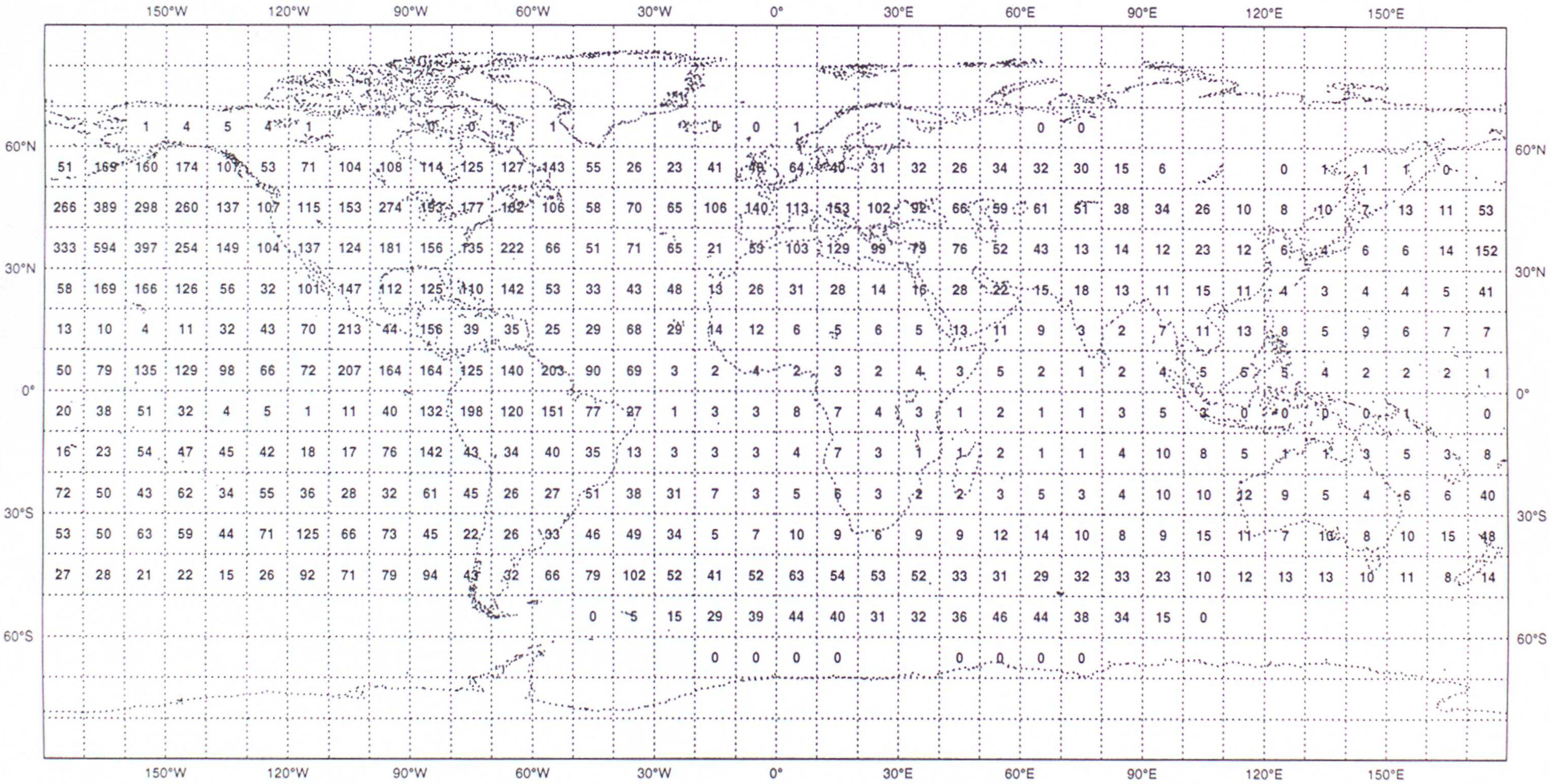

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
1 4 5 4 1 0 0 1 1 0 0 1 0 0
51 169 160 174 107 53 71 104 108 114 125 127 143 55 26 23 41 48 64 40 31 32 26 34 32 30 15 6 0 1 1 1 0
266 389 298 260 137 107 115 153 274 153 177 162 106 58 70 65 106 140 113 153 102 92 66 59 61 51 38 34 26 10 8 10 7 13 11 53
333 594 397 254 149 104 137 124 181 156 135 222 66 51 71 65 21 53 103 129 99 79 76 52 43 13 14 12 23 12 6 4 6 6 14 152
58 169 166 126 56 32 101 147 112 125 110 142 53 33 43 48 13 26 31 28 14 16 28 22 15 18 13 11 15 11 4 3 4 4 5 41
13 10 4 11 32 43 70 213 44 156 39 35 25 29 68 29 14 12 6 5 6 5 13 11 9 3 2 7 11 13 8 5 9 6 7 7
50 79 135 129 98 66 72 207 164 164 125 140 203 90 69 3 2 4 2 3 2 4 3 5 2 1 2 4 5 5 5 4 2 2 2 1
20 38 51 32 4 5 1 11 40 132 198 120 151 77 27 1 3 3 8 7 4 3 1 2 1 1 3 5 3 0 0 0 0 1 0
16 23 54 47 45 42 18 17 76 142 43 34 40 35 13 3 3 3 4 7 3 1 1 2 1 1 4 10 8 5 1 1 3 5 3 8
72 50 43 62 34 55 36 28 32 61 45 26 27 51 38 31 7 3 5 6 3 2 2 3 5 3 4 10 10 12 9 5 4 6 6 40
53 50 63 59 44 71 125 66 73 45 22 26 33 46 49 34 5 7 10 9 6 9 9 12 14 10 8 9 15 11 7 10 8 10 15 48
27 28 21 22 15 26 92 71 79 94 43 32 66 79 102 52 41 52 63 54 53 52 33 31 29 32 33 23 10 12 13 13 10 11 8 14
0 5 15 29 39 44 40 31 32 36 46 44 38 34 15 0
0 0 0 0 0 0 0 0

Figure 16. SATOB 401 - 700 hPa vector mean wind. JANUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

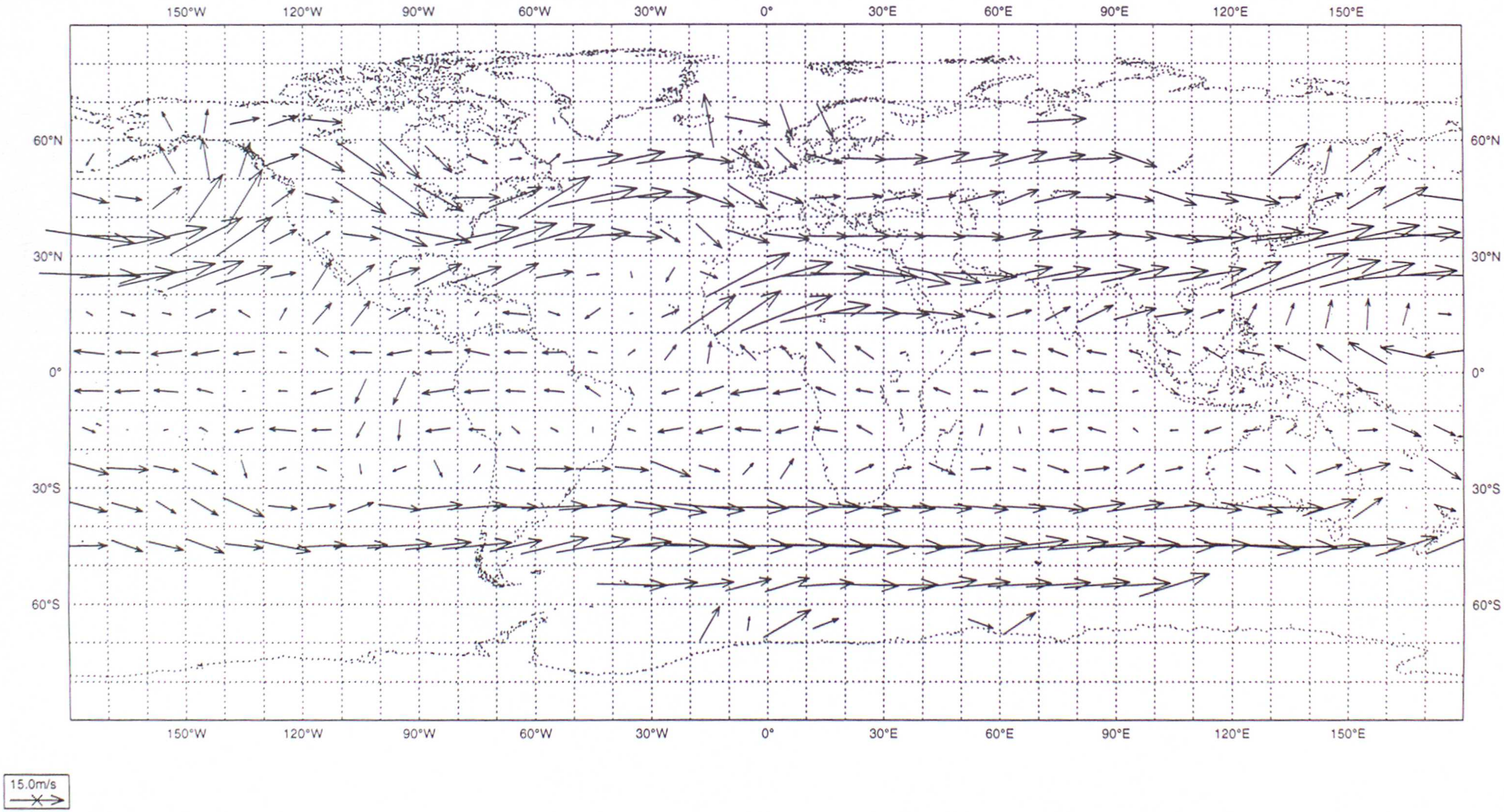

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. JANUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

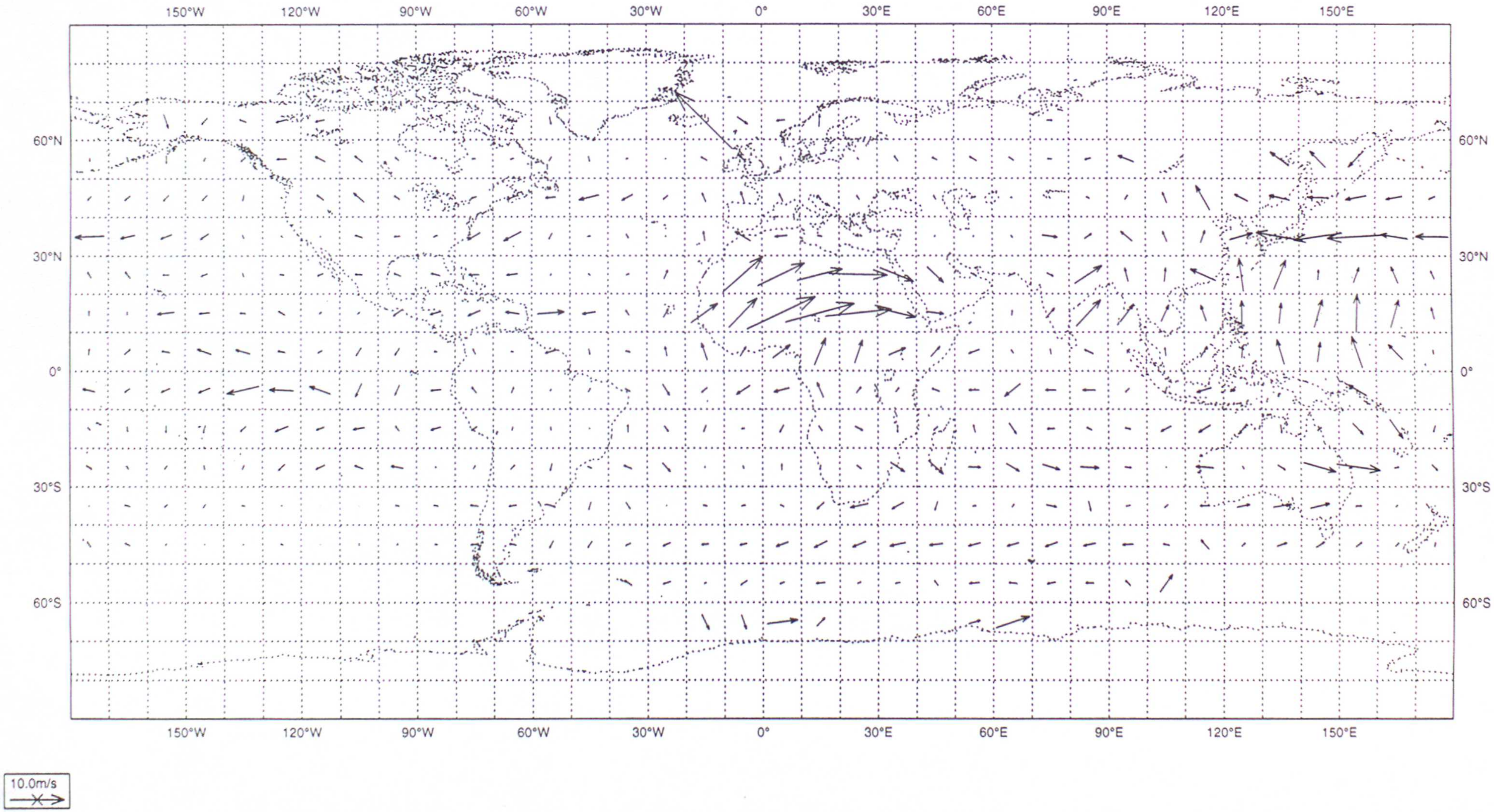

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). JANUARY 2003
All observations
Values are plotted where greater than 10 obs are present

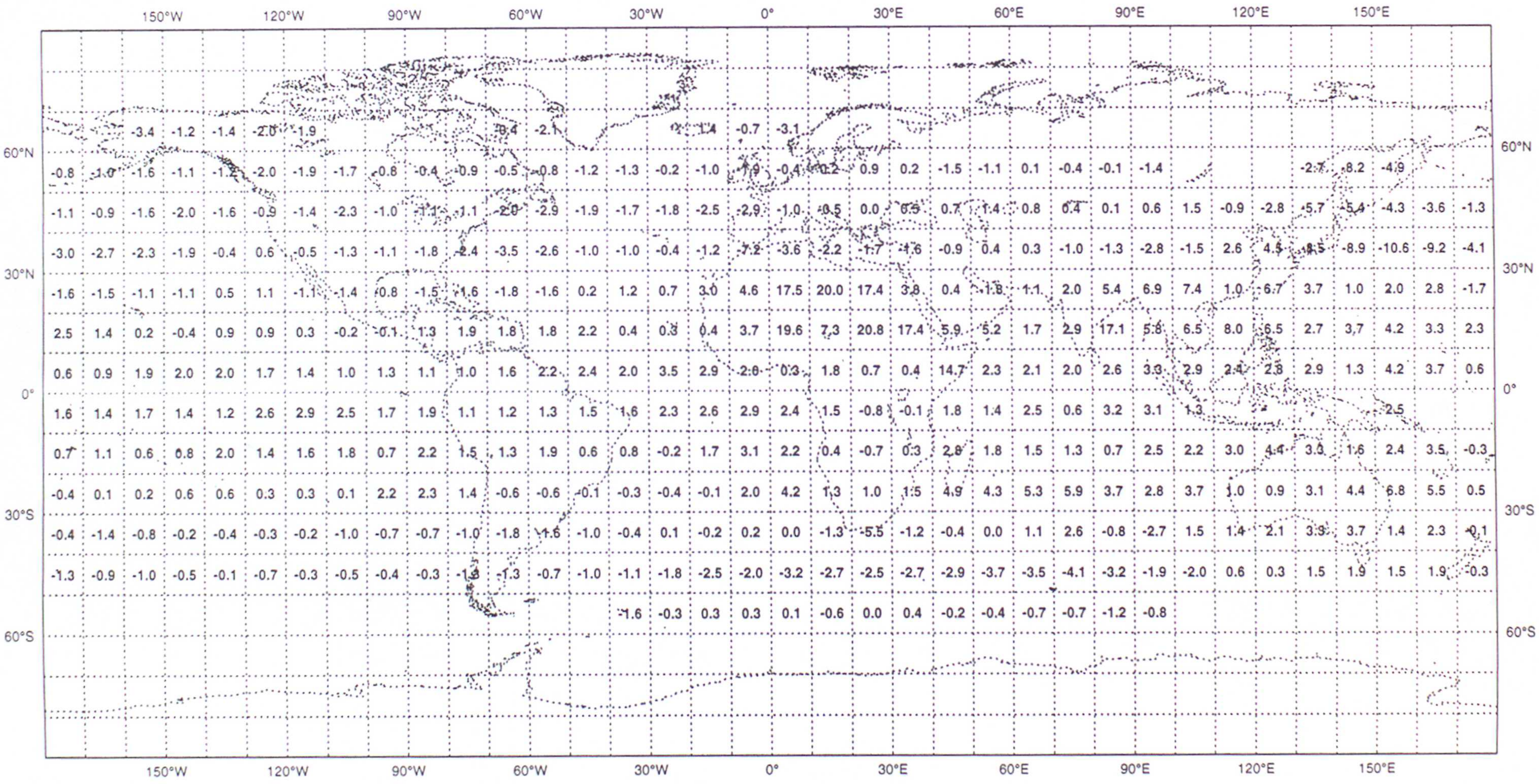

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). JANUARY 2003
All observations
Values are plotted where greater than 10 obs are present

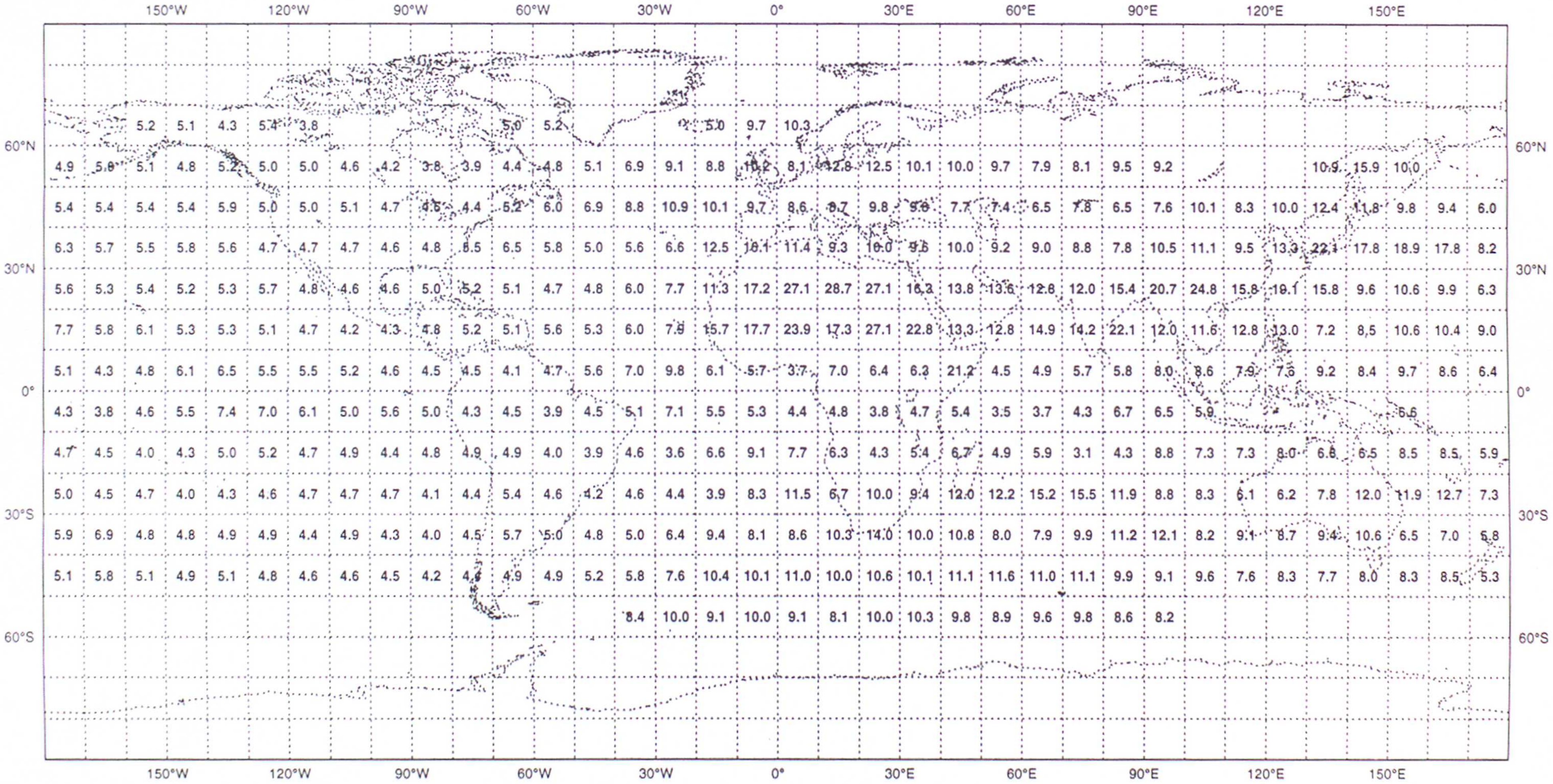
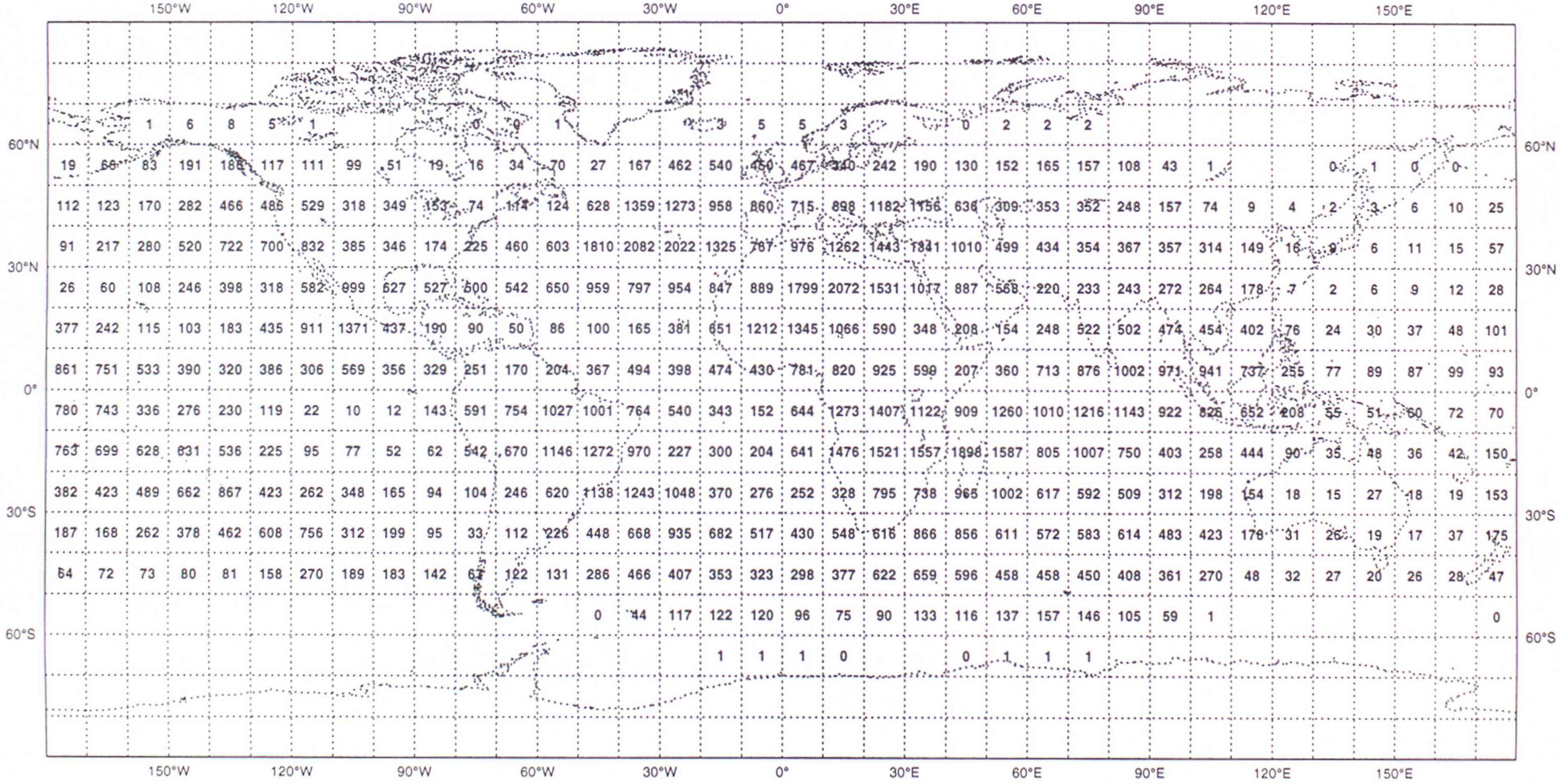

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
5.2 5.1 4.3 5.4 3.8 5.0 5.2 5.0 9.7 10.3
4.9 5.8 5.1 4.8 5.2 5.0 5.0 4.6 4.2 3.8 3.9 4.4 4.8 5.1 6.9 9.1 8.8 10.2 8.1 12.8 12.5 10.1 10.0 9.7 7.9 8.1 9.5 9.2 10.9 15.9 10.0
5.4 5.4 5.4 5.4 5.9 5.0 5.0 5.1 4.7 4.5 4.4 5.2 6.0 6.9 8.8 10.9 10.1 9.7 8.6 8.7 9.8 9.6 7.7 7.4 6.5 7.8 6.5 7.6 10.1 8.3 10.0 12.4 11.8 9.8 9.4 6.0
6.3 5.7 5.5 5.8 5.6 4.7 4.7 4.7 4.6 4.8 8.5 6.5 5.8 5.0 5.6 6.6 12.5 18.1 11.4 9.3 10.0 9.5 10.0 9.2 9.0 8.8 7.8 10.5 11.1 9.5 13.3 22.1 17.8 18.9 17.8 8.2
5.6 5.3 5.4 5.2 5.3 5.7 4.8 4.6 4.6 5.0 5.2 5.1 4.7 4.8 6.0 7.7 11.3 17.2 27.1 28.7 27.1 16.3 13.8 13.6 12.8 12.0 15.4 20.7 24.8 15.8 19.1 15.8 9.6 10.6 9.9 6.3
7.7 5.8 6.1 5.3 5.3 5.1 4.7 4.2 4.3 4.8 5.2 5.1 5.6 5.3 6.0 7.9 15.7 17.7 23.9 17.3 27.1 22.8 13.3 12.8 14.9 14.2 22.1 12.0 11.6 12.8 13.0 7.2 8.5 10.6 10.4 9.0
5.1 4.3 4.8 6.1 6.5 5.5 5.5 5.2 4.6 4.5 4.5 4.1 4.7 5.6 7.0 9.8 6.1 5.7 3.7 7.0 6.4 6.3 21.2 4.5 4.9 5.7 5.8 8.0 8.6 7.9 7.3 9.2 8.4 9.7 8.6 6.4
4.3 3.8 4.6 5.5 7.4 7.0 6.1 5.0 5.6 5.0 4.3 4.5 3.9 4.5 5.1 7.1 5.5 5.3 4.4 4.8 3.8 4.7 5.4 3.5 3.7 4.3 6.7 6.5 5.9 5.6
4.7 4.5 4.0 4.3 5.0 5.2 4.7 4.9 4.4 4.8 4.9 4.9 4.0 3.9 4.6 3.6 6.6 9.1 7.7 6.3 4.3 5.4 6.7 4.9 5.9 3.1 4.3 8.8 7.3 7.3 8.0 6.8 6.5 8.5 8.5 5.9
5.0 4.5 4.7 4.0 4.3 4.6 4.7 4.7 4.7 4.1 4.4 5.4 4.6 4.2 4.6 4.4 3.9 8.3 11.5 6.7 10.0 9.4 12.0 12.2 15.2 15.5 11.9 8.8 8.3 6.1 6.2 7.8 12.0 11.9 12.7 7.3
5.9 6.9 4.8 4.8 4.9 4.9 4.4 4.9 4.3 4.0 4.5 5.7 5.0 4.8 5.0 6.4 9.4 8.1 8.6 10.3 14.0 10.0 10.8 8.0 7.9 9.9 11.2 12.1 8.2 9.1 8.7 9.4 10.6 6.5 7.0 5.8
5.1 5.8 5.1 4.9 5.1 4.8 4.6 4.6 4.5 4.2 4.4 4.9 4.9 5.2 5.8 7.6 10.4 10.1 11.0 10.0 10.6 10.1 11.1 11.6 11.0 11.1 9.9 9.1 9.6 7.6 8.3 7.7 8.0 8.3 8.5 5.3
8.4 10.0 9.1 10.0 9.1 8.1 10.0 10.3 9.8 8.9 9.6 9.8 8.6 8.2

Figure 20. SATOB 101 - 400 hPa mean daily count. JANUARY 2003
Global average number of observations in 24 hours = 174543



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 6 | 8 | 5 | 1 | | | | 0 | 0 | 1 | | | | 3 | 5 | 5 | 3 | | | 0 | 2 | 2 | 2 | | | | | | | | | | |
| 19 | 66 | 83 | 191 | 188 | 117 | 111 | 99 | 51 | 19 | 16 | 34 | 70 | 27 | 167 | 462 | 540 | 450 | 467 | 340 | 242 | 190 | 130 | 152 | 165 | 157 | 108 | 43 | 1 | | | 0 | 1 | 0 | 0 | |
| 112 | 123 | 170 | 282 | 466 | 486 | 529 | 318 | 349 | 153 | 74 | 114 | 124 | 628 | 1359 | 1273 | 958 | 860 | 715 | 898 | 1182 | 1156 | 636 | 309 | 353 | 352 | 248 | 157 | 74 | 9 | 4 | 2 | 3 | 6 | 10 | 25 |
| 91 | 217 | 280 | 520 | 722 | 700 | 832 | 385 | 346 | 174 | 225 | 460 | 603 | 1810 | 2082 | 2022 | 1325 | 787 | 976 | 1262 | 1443 | 1841 | 1010 | 499 | 434 | 354 | 367 | 357 | 314 | 149 | 16 | 9 | 6 | 11 | 15 | 57 |
| 26 | 60 | 108 | 246 | 398 | 318 | 582 | 899 | 627 | 527 | 500 | 542 | 650 | 959 | 797 | 954 | 847 | 889 | 1799 | 2072 | 1531 | 1017 | 887 | 568 | 220 | 233 | 243 | 272 | 264 | 178 | 7 | 2 | 6 | 9 | 12 | 28 |
| 377 | 242 | 115 | 103 | 183 | 435 | 911 | 1371 | 437 | 190 | 90 | 50 | 86 | 100 | 165 | 381 | 651 | 1212 | 1345 | 1066 | 590 | 348 | 208 | 154 | 248 | 522 | 502 | 474 | 454 | 402 | 76 | 24 | 30 | 37 | 48 | 101 |
| 861 | 751 | 533 | 390 | 320 | 386 | 306 | 569 | 356 | 329 | 251 | 170 | 204 | 367 | 494 | 398 | 474 | 430 | 781 | 820 | 925 | 599 | 207 | 360 | 713 | 876 | 1002 | 971 | 941 | 737 | 255 | 77 | 89 | 87 | 99 | 93 |
| 780 | 743 | 336 | 276 | 230 | 119 | 22 | 10 | 12 | 143 | 591 | 754 | 1027 | 1001 | 764 | 540 | 343 | 152 | 644 | 1273 | 1407 | 1122 | 909 | 1260 | 1010 | 1216 | 1143 | 922 | 826 | 652 | 208 | 55 | 51 | 60 | 72 | 70 |
| 763 | 699 | 628 | 631 | 536 | 225 | 95 | 77 | 52 | 62 | 542 | 670 | 1146 | 1272 | 970 | 227 | 300 | 204 | 641 | 1476 | 1521 | 1557 | 1898 | 1587 | 805 | 1007 | 750 | 403 | 258 | 444 | 90 | 35 | 48 | 36 | 42 | 150 |
| 382 | 423 | 489 | 662 | 867 | 423 | 262 | 348 | 165 | 94 | 104 | 246 | 620 | 1138 | 1243 | 1048 | 370 | 276 | 252 | 328 | 795 | 738 | 965 | 1002 | 617 | 592 | 509 | 312 | 198 | 154 | 18 | 15 | 27 | 18 | 19 | 153 |
| 187 | 168 | 262 | 378 | 462 | 608 | 756 | 312 | 199 | 95 | 33 | 112 | 226 | 448 | 668 | 935 | 682 | 517 | 430 | 548 | 616 | 866 | 856 | 611 | 572 | 583 | 614 | 483 | 423 | 178 | 31 | 26 | 19 | 17 | 37 | 175 |
| 64 | 72 | 73 | 80 | 81 | 158 | 270 | 189 | 183 | 142 | 67 | 122 | 131 | 286 | 466 | 407 | 353 | 323 | 298 | 377 | 622 | 659 | 596 | 458 | 458 | 450 | 408 | 361 | 270 | 48 | 32 | 27 | 20 | 26 | 28 | 47 |
| | | | | | | | | | | | | | 0 | 44 | 117 | 122 | 120 | 96 | 75 | 90 | 133 | 116 | 137 | 157 | 146 | 105 | 59 | 1 | | | | | | | 0 |
| | | | | | | | | | | | | | | | | 1 | 1 | 1 | 0 | | | 0 | 1 | 1 | 1 | | | | | | | | | | |

Figure 21. SATOB 101 - 400 hPa vector mean wind. JANUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

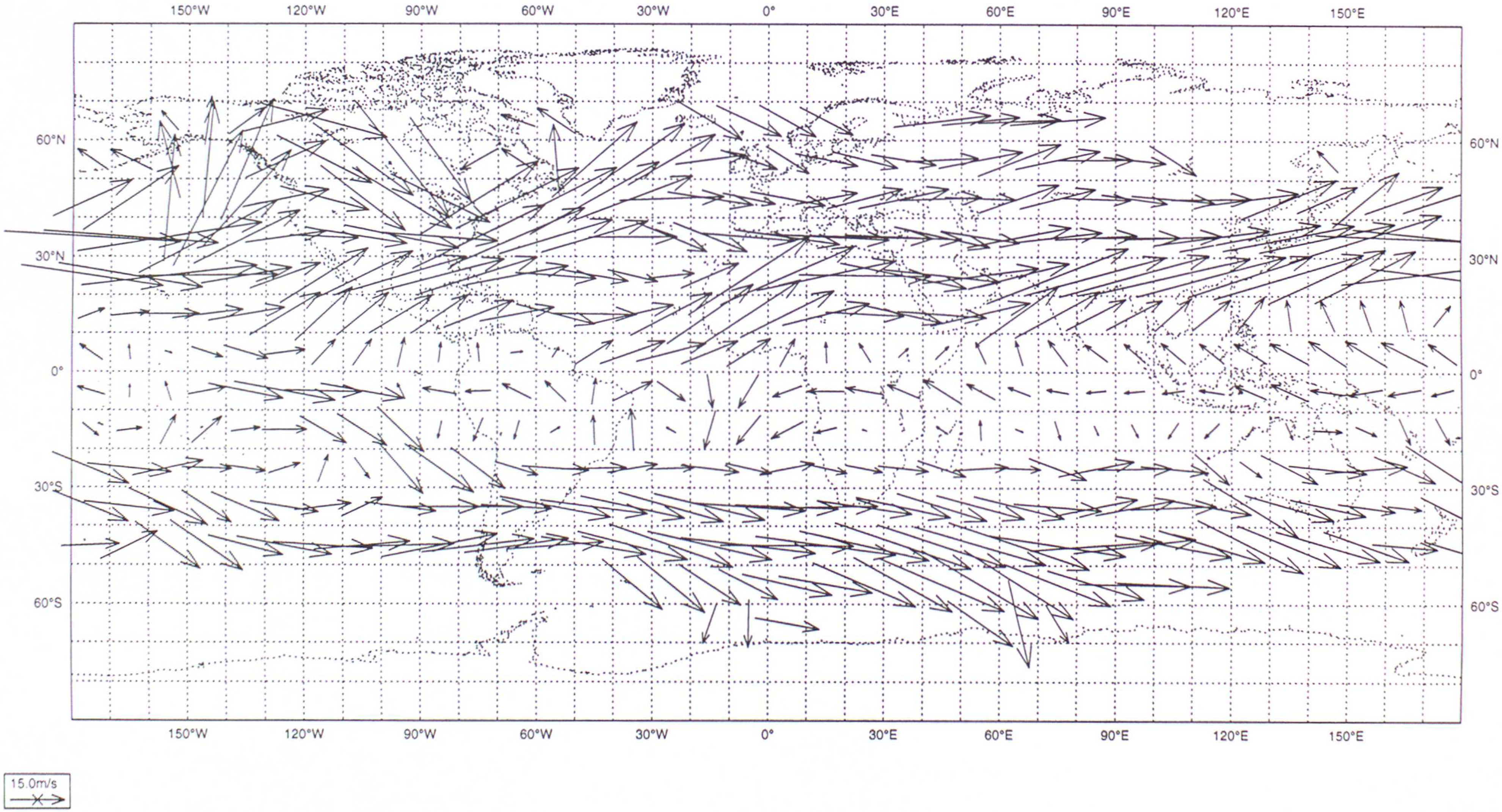

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. JANUARY 2003
All observations
Arrows are plotted where greater than 10 obs are present

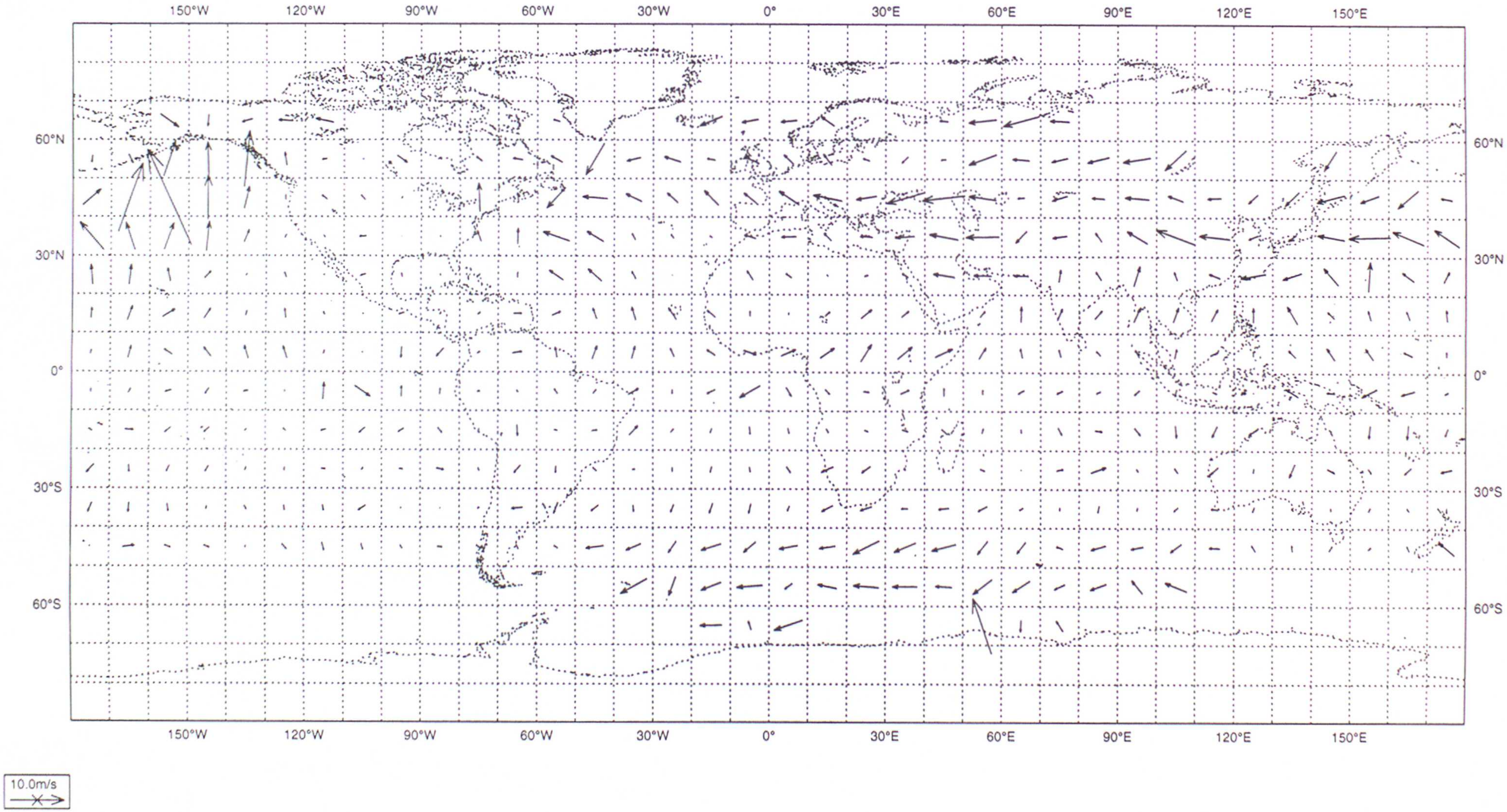

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). JANUARY 2003
All observations
Values are plotted where greater than 10 obs are present

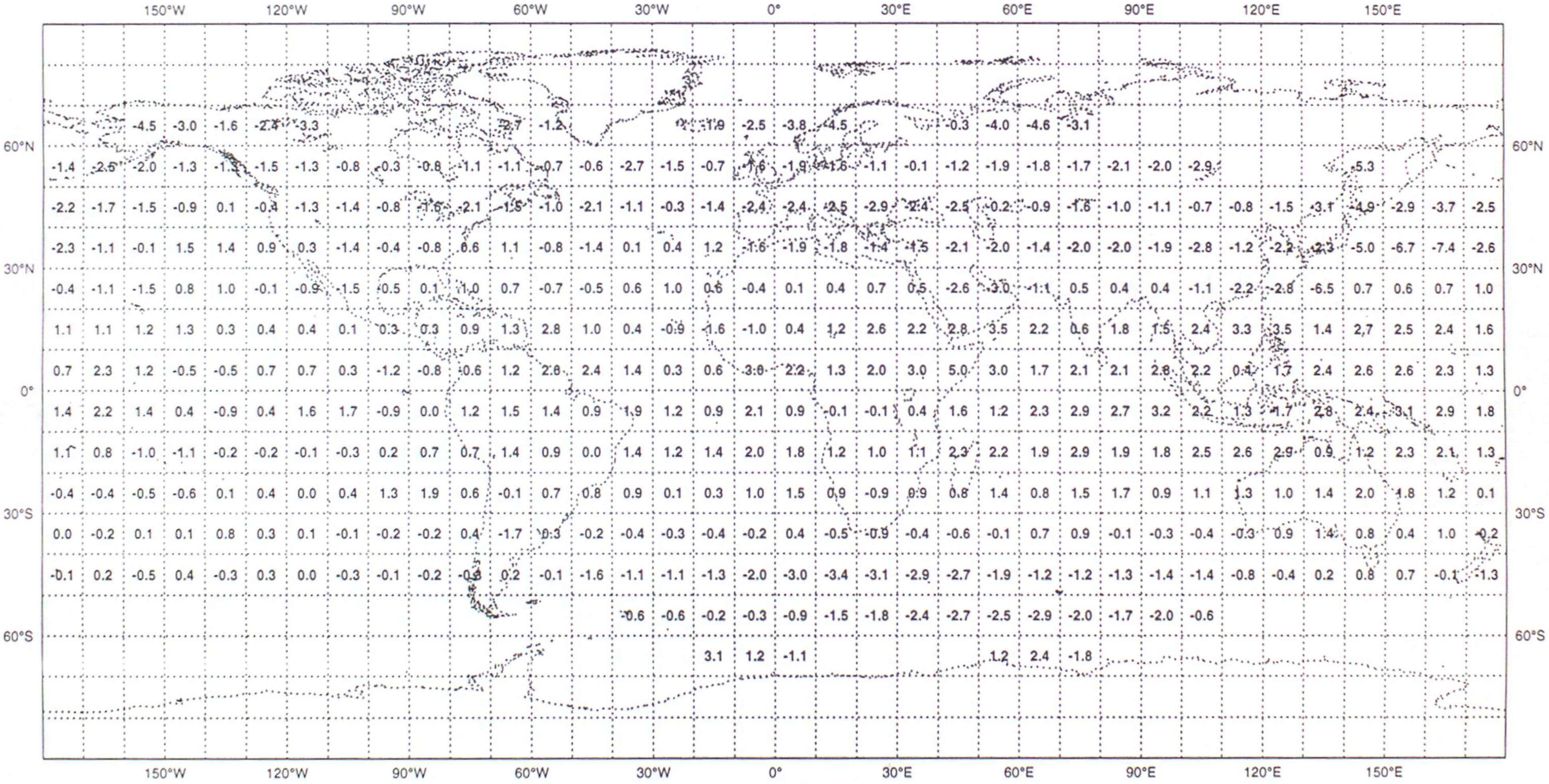
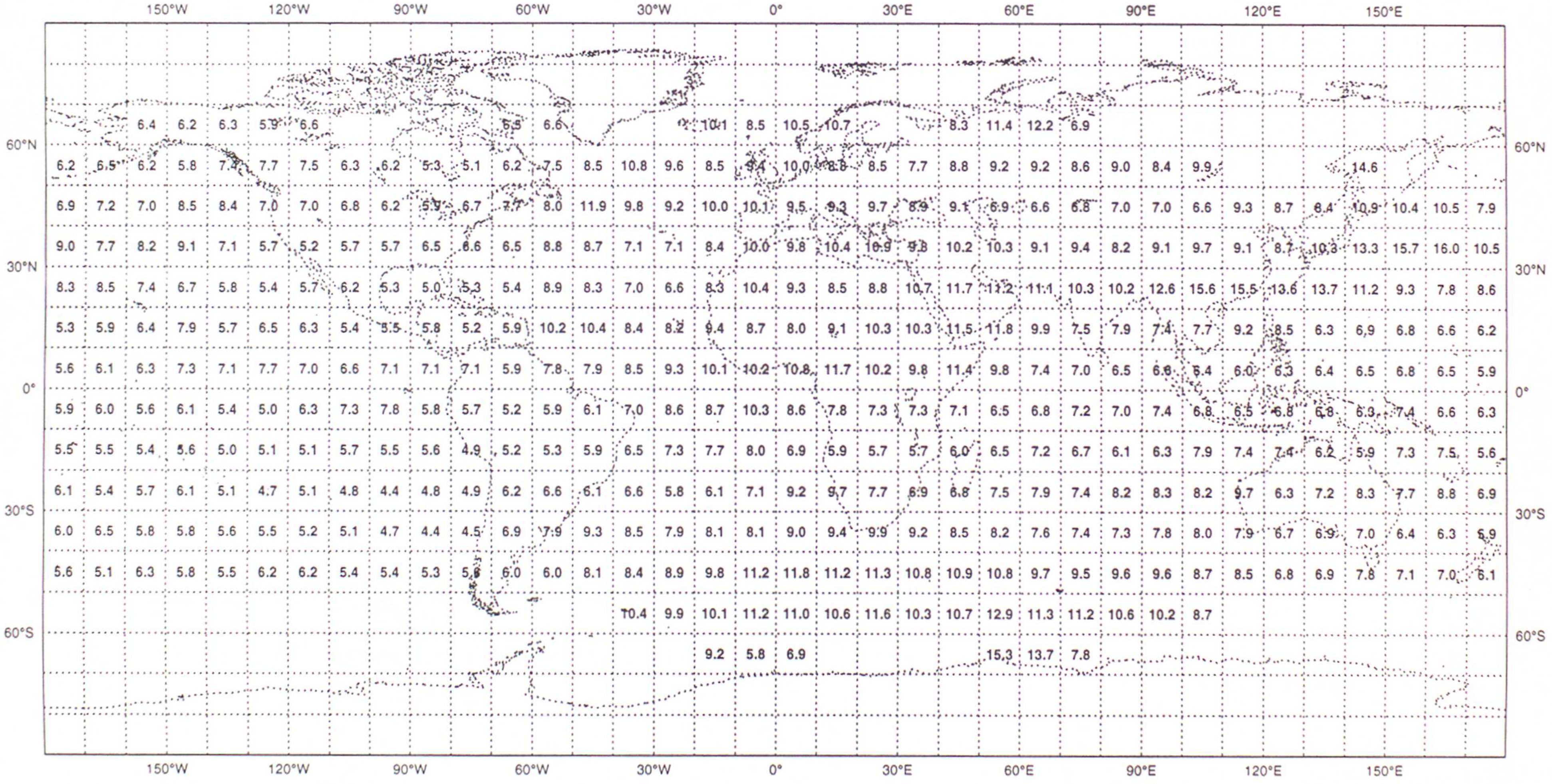

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-4.5 -3.0 -1.6 -2.4 -3.3 -2.7 -1.2 -1.9 -2.5 -3.8 -4.5 -0.3 -4.0 -4.6 -3.1
-1.4 -2.5 -2.0 -1.3 -1.3 -1.5 -1.3 -0.8 -0.3 -0.8 -1.1 -1.1 -0.7 -0.6 -2.7 -1.5 -0.7 -1.6 -1.9 -1.6 -1.1 -0.1 -1.2 -1.9 -1.8 -1.7 -2.1 -2.0 -2.9 -5.3
-2.2 -1.7 -1.5 -0.9 0.1 -0.4 -1.3 -1.4 -0.8 -1.6 -2.1 -1.5 -1.0 -2.1 -1.1 -0.3 -1.4 -2.4 -2.4 -2.5 -2.9 -2.4 -2.5 -0.2 -0.9 -1.6 -1.0 -1.1 -0.7 -0.8 -1.5 -3.1 -4.9 -2.9 -3.7 -2.5
-2.3 -1.1 -0.1 1.5 1.4 0.9 0.3 -1.4 -0.4 -0.8 0.6 1.1 -0.8 -1.4 0.1 0.4 1.2 -1.6 -1.9 -1.8 -1.4 -1.5 -2.1 -2.0 -1.4 -2.0 -2.0 -1.9 -2.8 -1.2 -2.2 -2.3 -5.0 -6.7 -7.4 -2.6
-0.4 -1.1 -1.5 0.8 1.0 -0.1 -0.9 -1.5 0.5 0.1 1.0 0.7 -0.7 -0.5 0.6 1.0 0.6 -0.4 0.1 0.4 0.7 0.5 -2.6 -3.0 -1.1 0.5 0.4 0.4 -1.1 -2.2 -2.8 -6.5 0.7 0.6 0.7 1.0
1.1 1.1 1.2 1.3 0.3 0.4 0.4 0.1 0.3 0.3 0.9 1.3 2.8 1.0 0.4 -0.9 -1.6 -1.0 0.4 1.2 2.6 2.2 2.8 3.5 2.2 0.6 1.8 1.5 2.4 3.3 3.5 1.4 2.7 2.5 2.4 1.6
0.7 2.3 1.2 -0.5 -0.5 0.7 0.7 0.3 -1.2 -0.8 0.6 1.2 2.8 2.4 1.4 0.3 0.6 3.8 2.2 1.3 2.0 3.0 5.0 3.0 1.7 2.1 2.1 2.8 2.2 0.4 1.7 2.4 2.6 2.6 2.3 1.3
1.4 2.2 1.4 0.4 -0.9 0.4 1.6 1.7 -0.9 0.0 1.2 1.5 1.4 0.9 1.9 1.2 0.9 2.1 0.9 -0.1 -0.1 0.4 1.6 1.2 2.3 2.9 2.7 3.2 2.2 1.3 1.7 2.8 2.4 3.1 2.9 1.8
1.1 0.8 -1.0 -1.1 -0.2 -0.2 -0.1 -0.3 0.2 0.7 0.7 1.4 0.9 0.0 1.4 1.2 1.4 2.0 1.8 1.2 1.0 1.1 2.3 2.2 1.9 2.9 1.9 1.8 2.5 2.6 2.9 0.9 1.2 2.3 2.1 1.3
-0.4 -0.4 -0.5 -0.6 0.1 0.4 0.0 0.4 1.3 1.9 0.6 -0.1 0.7 0.8 0.9 0.1 0.3 1.0 1.5 0.9 -0.9 0.9 0.8 1.4 0.8 1.5 1.7 0.9 1.1 1.3 1.0 1.4 2.0 1.8 1.2 0.1
0.0 -0.2 0.1 0.1 0.8 0.3 0.1 -0.1 -0.2 -0.2 0.4 -1.7 0.3 -0.2 -0.4 -0.3 -0.4 -0.2 0.4 -0.5 -0.9 -0.4 -0.6 -0.1 0.7 0.9 -0.1 -0.3 -0.4 -0.3 0.9 1.4 0.8 0.4 1.0 -0.2
-0.1 0.2 -0.5 0.4 -0.3 0.3 0.0 -0.3 -0.1 -0.2 -0.3 0.2 -0.1 -1.6 -1.1 -1.1 -1.3 -2.0 -3.0 -3.4 -3.1 -2.9 -2.7 -1.9 -1.2 -1.2 -1.3 -1.4 -1.4 -0.8 -0.4 0.2 0.8 0.7 -0.1 -1.3
-0.6 -0.6 -0.2 -0.3 -0.9 -1.5 -1.8 -2.4 -2.7 -2.5 -2.9 -2.0 -1.7 -2.0 -0.6
3.1 1.2 -1.1 1.2 2.4 -1.8

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). JANUARY 2003
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
6.4 6.2 6.3 5.9 6.6 5.5 6.6 10.1 8.5 10.5 10.7 8.3 11.4 12.2 6.9
6.2 6.5 6.2 5.8 7.4 7.7 7.5 6.3 6.2 5.3 5.1 6.2 7.5 8.5 10.8 9.6 8.5 9.4 10.0 8.8 8.5 7.7 8.8 9.2 9.2 8.6 9.0 8.4 9.9 14.6
6.9 7.2 7.0 8.5 8.4 7.0 7.0 6.8 6.2 5.9 6.7 7.7 8.0 11.9 9.8 9.2 10.0 10.1 9.5 9.3 9.7 8.9 9.1 6.9 6.6 6.8 7.0 7.0 6.6 9.3 8.7 8.4 10.9 10.4 10.5 7.9
9.0 7.7 8.2 9.1 7.1 5.7 5.2 5.7 5.7 6.5 6.6 6.5 8.8 8.7 7.1 7.1 8.4 10.0 9.8 10.4 10.9 9.8 10.2 10.3 9.1 9.4 8.2 9.1 9.7 9.1 8.7 10.3 13.3 15.7 16.0 10.5
8.3 8.5 7.4 6.7 5.8 5.4 5.7 6.2 5.3 5.0 5.3 5.4 8.9 8.3 7.0 6.6 8.3 10.4 9.3 8.5 8.8 10.7 11.7 11.2 11.1 10.3 10.2 12.6 15.6 15.5 13.6 13.7 11.2 9.3 7.8 8.6
5.3 5.9 6.4 7.9 5.7 6.5 6.3 5.4 5.5 5.8 5.2 5.9 10.2 10.4 8.4 8.2 9.4 8.7 8.0 9.1 10.3 10.3 11.5 11.8 9.9 7.5 7.9 7.4 7.7 9.2 8.5 6.3 6.9 6.8 6.6 6.2
5.6 6.1 6.3 7.3 7.1 7.7 7.0 6.6 7.1 7.1 7.1 5.9 7.8 7.9 8.5 9.3 10.1 10.2 10.8 11.7 10.2 9.8 11.4 9.8 7.4 7.0 6.5 6.6 6.4 6.0 6.3 6.4 6.5 6.8 6.5 5.9
5.9 6.0 5.6 6.1 5.4 5.0 6.3 7.3 7.8 5.8 5.7 5.2 5.9 6.1 7.0 8.6 8.7 10.3 8.6 7.8 7.3 7.3 7.1 6.5 6.8 7.2 7.0 7.4 6.8 6.5 6.8 6.8 6.3 7.4 6.6 6.3
5.5 5.5 5.4 5.6 5.0 5.1 5.1 5.7 5.5 5.6 4.9 5.2 5.3 5.9 6.5 7.3 7.7 8.0 6.9 5.9 5.7 5.7 6.0 6.5 7.2 6.7 6.1 6.3 7.9 7.4 7.4 6.2 5.9 7.3 7.5 5.6
6.1 5.4 5.7 6.1 5.1 4.7 5.1 4.8 4.4 4.8 4.9 6.2 6.6 6.1 6.6 5.8 6.1 7.1 9.2 9.7 7.7 6.9 6.8 7.5 7.9 7.4 8.2 8.3 8.2 9.7 6.3 7.2 8.3 7.7 8.8 6.9
6.0 6.5 5.8 5.8 5.6 5.5 5.2 5.1 4.7 4.4 4.5 6.9 7.9 9.3 8.5 7.9 8.1 8.1 9.0 9.4 9.9 9.2 8.5 8.2 7.6 7.4 7.3 7.8 8.0 7.9 6.7 6.9 7.0 6.4 6.3 5.9
5.6 5.1 6.3 5.8 5.5 6.2 6.2 5.4 5.4 5.3 5.6 6.0 6.0 8.1 8.4 8.9 9.8 11.2 11.8 11.2 11.3 10.8 10.9 10.8 9.7 9.5 9.6 9.6 8.7 8.5 6.8 6.9 7.8 7.1 7.0 6.1
10.4 9.9 10.1 11.2 11.0 10.6 11.6 10.3 10.7 12.9 11.3 11.2 10.6 10.2 8.7
9.2 5.8 6.9 15.3 13.7 7.8

## MONITORING OF SATELLITE TEMPERATURES

## MONITORING CENTRE: BRACKNELL

## MONTH: January 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from NOAA-15, NOAA-16 and NOAA-17.

**Standard of comparison** :Background field from UKMO global model.

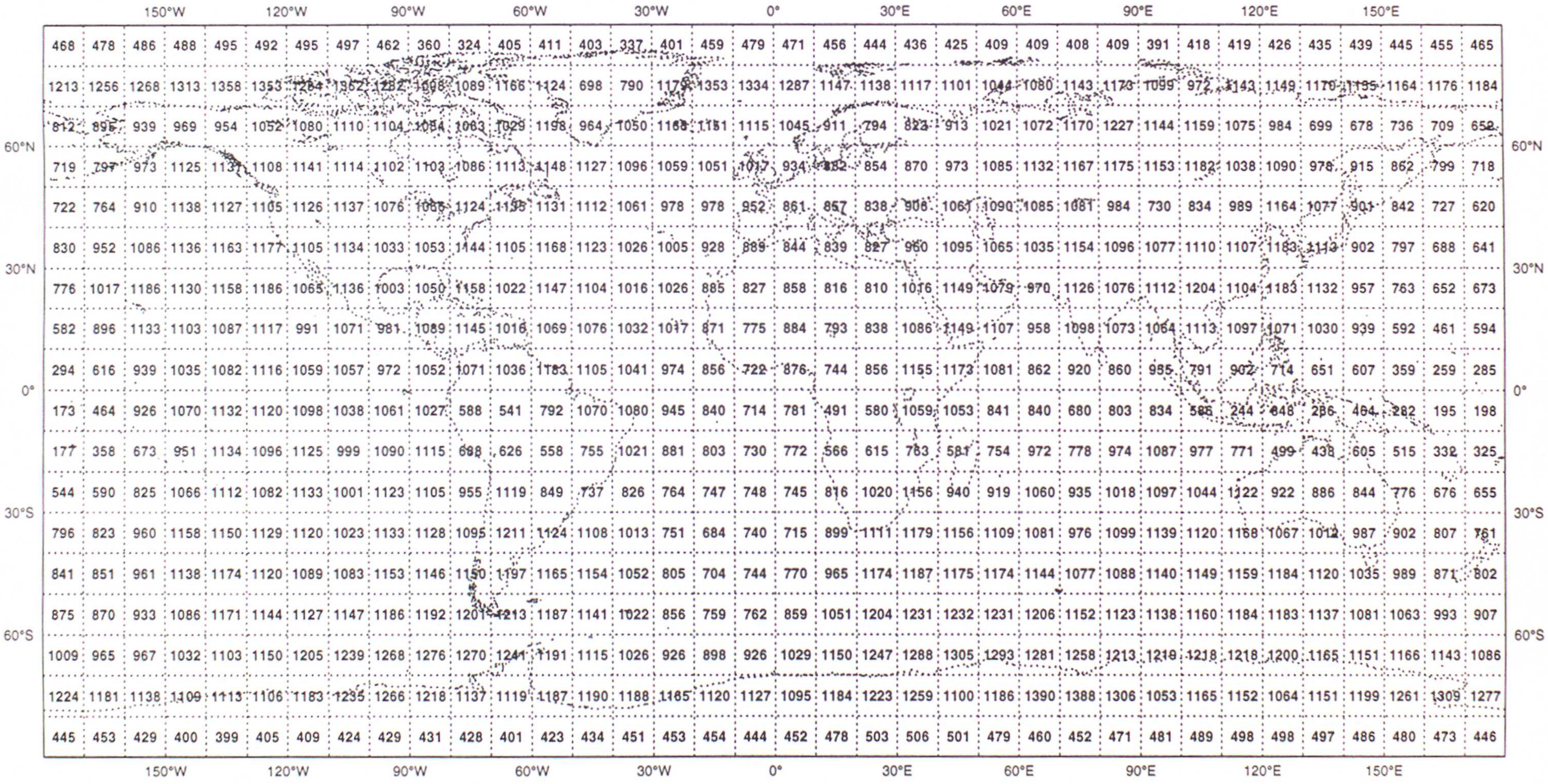
**Selection Criteria** :All soundings.

**Data Extracted** :Sounding channels (and approximate weighting function peaks, hPa)

- HIRS8 (Surface)
- HIRS15 (700)
- HIRS11 (500-700)
- HIRS4 (400)
- AMSUA5 (700)
- AMSUA7 (300)
- AMSUA9 (100)

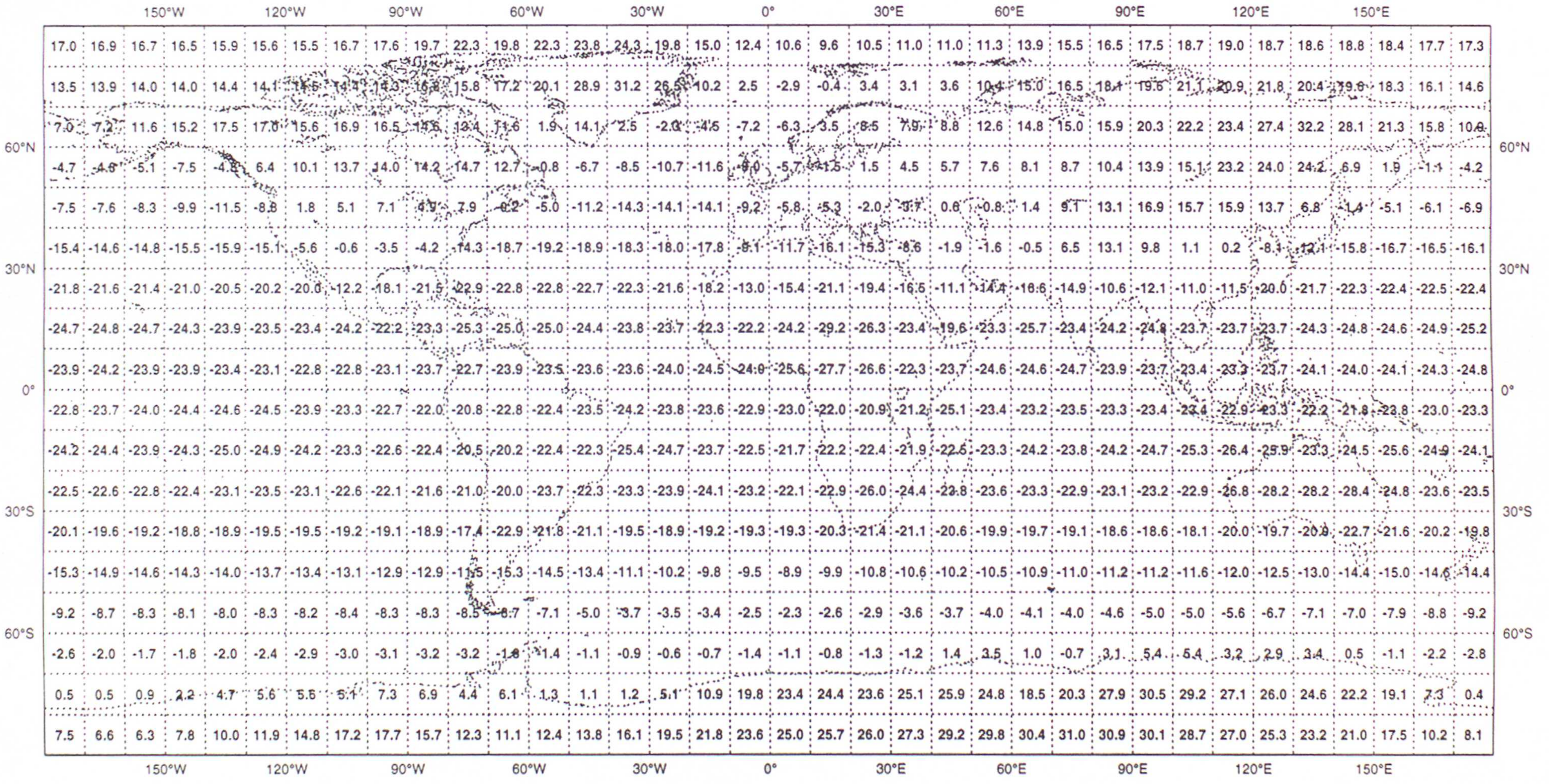
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. JANUARY 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 604665



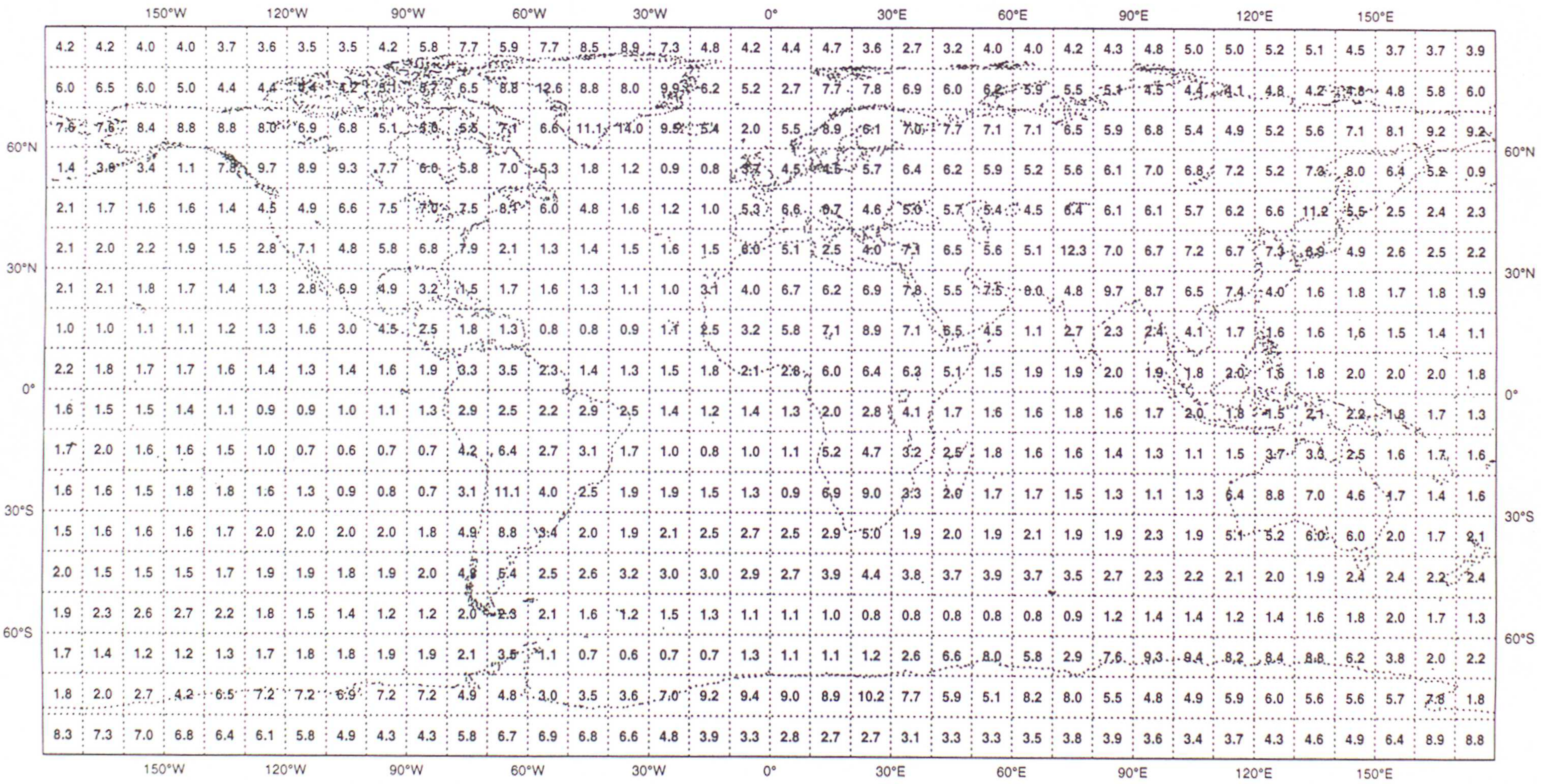
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 468 | 478 | 486 | 488 | 495 | 492 | 495 | 497 | 462 | 360 | 324 | 405 | 411 | 403 | 337 | 401 | 459 | 479 | 471 | 456 | 444 | 436 | 425 | 409 | 409 | 408 | 409 | 391 | 418 | 419 | 426 | 435 | 439 | 445 | 455 | 465 |
| 1213 | 1256 | 1268 | 1313 | 1358 | 1353 | 1284 | 1362 | 1282 | 1098 | 1089 | 1166 | 1124 | 698 | 790 | 1179 | 1353 | 1334 | 1287 | 1147 | 1138 | 1117 | 1101 | 1044 | 1080 | 1143 | 1173 | 1099 | 972 | 1143 | 1149 | 1170 | 1135 | 1164 | 1176 | 1184 |
| 812 | 896 | 939 | 969 | 954 | 1052 | 1080 | 1110 | 1104 | 1084 | 1063 | 1029 | 1198 | 964 | 1050 | 1168 | 1181 | 1115 | 1045 | 911 | 794 | 823 | 913 | 1021 | 1072 | 1170 | 1227 | 1144 | 1159 | 1075 | 984 | 699 | 678 | 736 | 709 | 652 |
| 719 | 797 | 973 | 1125 | 1131 | 1108 | 1141 | 1114 | 1102 | 1103 | 1086 | 1113 | 1148 | 1127 | 1096 | 1059 | 1051 | 1017 | 934 | 882 | 854 | 870 | 973 | 1085 | 1132 | 1167 | 1175 | 1153 | 1182 | 1038 | 1090 | 978 | 915 | 862 | 799 | 718 |
| 722 | 764 | 910 | 1138 | 1127 | 1105 | 1126 | 1137 | 1076 | 1088 | 1124 | 1135 | 1131 | 1112 | 1061 | 978 | 978 | 952 | 861 | 857 | 838 | 906 | 1061 | 1090 | 1085 | 1081 | 984 | 730 | 834 | 989 | 1164 | 1077 | 901 | 842 | 727 | 620 |
| 830 | 952 | 1086 | 1136 | 1163 | 1177 | 1105 | 1134 | 1033 | 1053 | 1144 | 1105 | 1168 | 1123 | 1026 | 1005 | 928 | 889 | 844 | 839 | 827 | 960 | 1095 | 1065 | 1035 | 1154 | 1096 | 1077 | 1110 | 1107 | 1183 | 1113 | 902 | 797 | 688 | 641 |
| 776 | 1017 | 1186 | 1130 | 1158 | 1186 | 1065 | 1136 | 1003 | 1050 | 1158 | 1022 | 1147 | 1104 | 1016 | 1026 | 885 | 827 | 858 | 816 | 810 | 1016 | 1149 | 1079 | 970 | 1126 | 1076 | 1112 | 1204 | 1104 | 1183 | 1132 | 957 | 763 | 652 | 673 |
| 582 | 896 | 1133 | 1103 | 1087 | 1117 | 991 | 1071 | 981 | 1089 | 1145 | 1016 | 1069 | 1076 | 1032 | 1017 | 871 | 775 | 884 | 793 | 838 | 1086 | 1149 | 1107 | 958 | 1098 | 1073 | 1064 | 1113 | 1097 | 1071 | 1030 | 939 | 592 | 461 | 594 |
| 294 | 616 | 939 | 1035 | 1082 | 1116 | 1059 | 1057 | 972 | 1052 | 1071 | 1036 | 1183 | 1105 | 1041 | 974 | 856 | 722 | 876 | 744 | 856 | 1155 | 1173 | 1081 | 862 | 920 | 860 | 955 | 791 | 902 | 714 | 651 | 607 | 359 | 259 | 285 |
| 173 | 464 | 926 | 1070 | 1132 | 1120 | 1098 | 1038 | 1061 | 1027 | 588 | 541 | 792 | 1070 | 1080 | 945 | 840 | 714 | 781 | 491 | 580 | 1059 | 1053 | 841 | 840 | 680 | 803 | 834 | 585 | 244 | 648 | 286 | 464 | 282 | 195 | 198 |
| 177 | 358 | 673 | 951 | 1134 | 1096 | 1125 | 999 | 1090 | 1115 | 698 | 626 | 558 | 755 | 1021 | 881 | 803 | 730 | 772 | 566 | 615 | 783 | 581 | 754 | 972 | 778 | 974 | 1087 | 977 | 771 | 499 | 438 | 605 | 515 | 332 | 325 |
| 544 | 590 | 825 | 1066 | 1112 | 1082 | 1133 | 1001 | 1123 | 1105 | 955 | 1119 | 849 | 737 | 826 | 764 | 747 | 748 | 745 | 816 | 1020 | 1156 | 940 | 919 | 1060 | 935 | 1018 | 1097 | 1044 | 1122 | 922 | 886 | 844 | 776 | 676 | 655 |
| 796 | 823 | 960 | 1158 | 1150 | 1129 | 1120 | 1023 | 1133 | 1128 | 1095 | 1211 | 1124 | 1108 | 1013 | 751 | 684 | 740 | 715 | 899 | 1111 | 1179 | 1156 | 1109 | 1081 | 976 | 1099 | 1139 | 1120 | 1168 | 1067 | 1012 | 987 | 902 | 807 | 761 |
| 841 | 851 | 961 | 1138 | 1174 | 1120 | 1089 | 1083 | 1153 | 1146 | 1150 | 1197 | 1165 | 1154 | 1052 | 805 | 704 | 744 | 770 | 965 | 1174 | 1187 | 1175 | 1174 | 1144 | 1077 | 1088 | 1140 | 1149 | 1159 | 1184 | 1120 | 1035 | 989 | 871 | 802 |
| 875 | 870 | 933 | 1086 | 1171 | 1144 | 1127 | 1147 | 1186 | 1192 | 1201 | 1213 | 1187 | 1141 | 1022 | 856 | 759 | 762 | 859 | 1051 | 1204 | 1231 | 1232 | 1231 | 1206 | 1152 | 1123 | 1138 | 1160 | 1184 | 1183 | 1137 | 1081 | 1063 | 993 | 907 |
| 1009 | 965 | 967 | 1032 | 1103 | 1150 | 1205 | 1239 | 1268 | 1276 | 1270 | 1241 | 1191 | 1115 | 1026 | 926 | 898 | 926 | 1029 | 1150 | 1247 | 1288 | 1305 | 1293 | 1281 | 1258 | 1213 | 1219 | 1218 | 1218 | 1200 | 1165 | 1151 | 1166 | 1143 | 1086 |
| 1224 | 1181 | 1138 | 1109 | 1113 | 1106 | 1183 | 1235 | 1266 | 1218 | 1137 | 1119 | 1187 | 1190 | 1188 | 1165 | 1120 | 1127 | 1095 | 1184 | 1223 | 1259 | 1100 | 1186 | 1390 | 1388 | 1306 | 1053 | 1165 | 1152 | 1064 | 1151 | 1199 | 1261 | 1309 | 1277 |
| 445 | 453 | 429 | 400 | 399 | 405 | 409 | 424 | 429 | 431 | 428 | 401 | 423 | 434 | 451 | 453 | 454 | 444 | 452 | 478 | 503 | 506 | 501 | 479 | 460 | 452 | 471 | 481 | 489 | 498 | 498 | 497 | 486 | 480 | 473 | 446 |

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



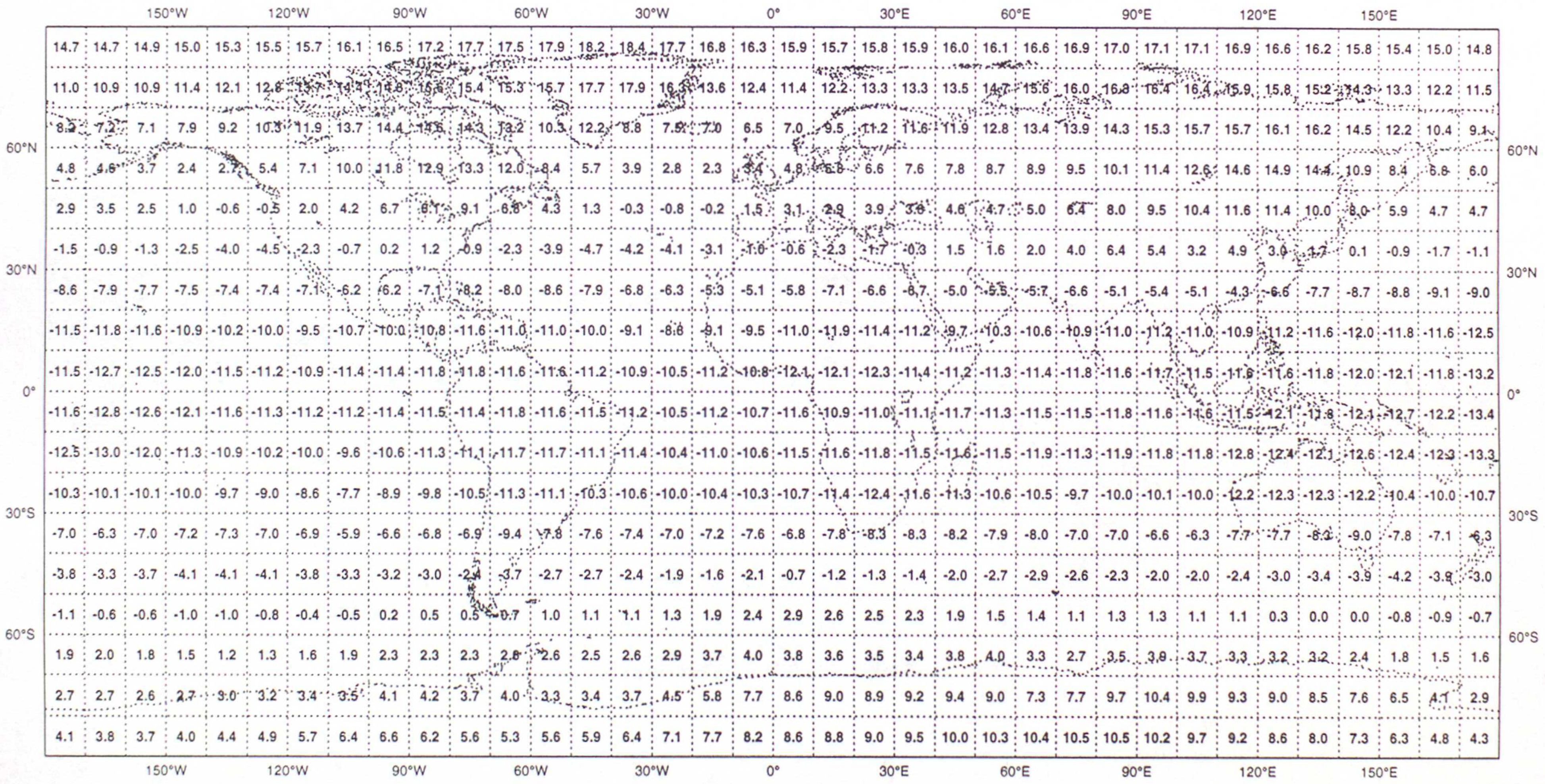
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17.0 | 16.9 | 16.7 | 16.5 | 15.9 | 15.6 | 15.5 | 16.7 | 17.6 | 19.7 | 22.3 | 19.8 | 22.3 | 23.8 | 24.3 | 19.8 | 15.0 | 12.4 | 10.6 | 9.6 | 10.5 | 11.0 | 11.0 | 11.3 | 13.9 | 15.5 | 16.5 | 17.5 | 18.7 | 19.0 | 18.7 | 18.6 | 18.8 | 18.4 | 17.7 | 17.3 |
| 13.5 | 13.9 | 14.0 | 14.0 | 14.4 | 14.1 | 14.5 | 14.4 | 14.3 | 16.8 | 15.8 | 17.2 | 20.1 | 28.9 | 31.2 | 26.5 | 10.2 | 2.5 | -2.9 | -0.4 | 3.4 | 3.1 | 3.6 | 10.4 | 15.0 | 16.5 | 18.1 | 19.6 | 21.1 | 20.9 | 21.8 | 20.4 | 19.6 | 18.3 | 16.1 | 14.6 |
| 7.0 | 7.2 | 11.6 | 15.2 | 17.5 | 17.0 | 15.6 | 16.9 | 16.5 | 14.6 | 13.4 | 11.6 | 1.9 | 14.1 | 2.5 | -2.0 | -4.5 | -7.2 | -6.3 | 3.5 | 8.5 | 7.9 | 8.8 | 12.6 | 14.8 | 15.0 | 15.9 | 20.3 | 22.2 | 23.4 | 27.4 | 32.2 | 28.1 | 21.3 | 15.8 | 10.8 |
| -4.7 | -4.6 | -5.1 | -7.5 | -4.8 | 6.4 | 10.1 | 13.7 | 14.0 | 14.2 | 14.7 | 12.7 | -0.8 | -6.7 | -8.5 | -10.7 | -11.6 | -9.0 | -5.7 | -1.5 | 1.5 | 4.5 | 5.7 | 7.6 | 8.1 | 8.7 | 10.4 | 13.9 | 15.1 | 23.2 | 24.0 | 24.2 | 6.9 | 1.9 | -1.1 | -4.2 |
| -7.5 | -7.6 | -8.3 | -9.9 | -11.5 | -8.8 | 1.8 | 5.1 | 7.1 | 4.9 | 7.9 | -0.2 | -5.0 | -11.2 | -14.3 | -14.1 | -14.1 | -9.2 | -5.8 | -5.3 | -2.0 | -3.7 | 0.6 | -0.8 | 1.4 | 9.1 | 13.1 | 16.9 | 15.7 | 15.9 | 13.7 | 6.8 | -1.4 | -5.1 | -6.1 | -6.9 |
| -15.4 | -14.6 | -14.8 | -15.5 | -15.9 | -15.1 | -5.6 | -0.6 | -3.5 | -4.2 | -14.3 | -18.7 | -19.2 | -18.9 | -18.3 | -18.0 | -17.8 | -8.1 | -11.7 | -16.1 | -15.3 | -8.6 | -1.9 | -1.6 | -0.5 | 6.5 | 13.1 | 9.8 | 1.1 | 0.2 | -8.1 | -12.1 | -15.8 | -16.7 | -16.5 | -16.1 |
| -21.8 | -21.6 | -21.4 | -21.0 | -20.5 | -20.2 | -20.0 | -12.2 | -18.1 | -21.5 | -22.9 | -22.8 | -22.8 | -22.7 | -22.3 | -21.6 | -18.2 | -13.0 | -15.4 | -21.1 | -19.4 | -16.5 | -11.1 | -14.4 | -16.6 | -14.9 | -10.6 | -12.1 | -11.0 | -11.5 | -20.0 | -21.7 | -22.3 | -22.4 | -22.5 | -22.4 |
| -24.7 | -24.8 | -24.7 | -24.3 | -23.9 | -23.5 | -23.4 | -24.2 | -22.2 | -23.3 | -25.3 | -25.0 | -25.0 | -24.4 | -23.8 | -23.7 | -22.3 | -22.2 | -24.2 | -29.2 | -26.3 | -23.4 | -19.6 | -23.3 | -25.7 | -23.4 | -24.2 | -24.8 | -23.7 | -23.7 | -23.7 | -24.3 | -24.8 | -24.6 | -24.9 | -25.2 |
| -23.9 | -24.2 | -23.9 | -23.9 | -23.4 | -23.1 | -22.8 | -22.8 | -23.1 | -23.7 | -22.7 | -23.9 | -23.5 | -23.6 | -23.6 | -24.0 | -24.5 | -24.0 | -25.6 | -27.7 | -26.6 | -22.3 | -23.7 | -24.6 | -24.6 | -24.7 | -23.9 | -23.7 | -23.4 | -23.3 | -23.7 | -24.1 | -24.0 | -24.1 | -24.3 | -24.8 |
| -22.8 | -23.7 | -24.0 | -24.4 | -24.6 | -24.5 | -23.9 | -23.3 | -22.7 | -22.0 | -20.8 | -22.8 | -22.4 | -23.5 | -24.2 | -23.8 | -23.6 | -22.9 | -23.0 | -22.0 | -20.9 | -21.2 | -25.1 | -23.4 | -23.2 | -23.5 | -23.3 | -23.4 | -23.4 | -22.9 | -23.3 | -22.2 | -21.8 | -23.8 | -23.0 | -23.3 |
| -24.2 | -24.4 | -23.9 | -24.3 | -25.0 | -24.9 | -24.2 | -23.3 | -22.6 | -22.4 | -20.5 | -20.2 | -22.4 | -22.3 | -25.4 | -24.7 | -23.7 | -22.5 | -21.7 | -22.2 | -22.4 | -21.9 | -22.5 | -23.3 | -24.2 | -23.8 | -24.2 | -24.7 | -25.3 | -26.4 | -25.9 | -23.3 | -24.5 | -25.6 | -24.9 | -24.1 |
| -22.5 | -22.6 | -22.8 | -22.4 | -23.1 | -23.5 | -23.1 | -22.6 | -22.1 | -21.6 | -21.0 | -20.0 | -23.7 | -22.3 | -23.3 | -23.9 | -24.1 | -23.2 | -22.1 | -22.9 | -26.0 | -24.4 | -22.8 | -23.6 | -23.3 | -22.9 | -23.1 | -23.2 | -22.9 | -26.8 | -28.2 | -28.2 | -28.4 | -24.8 | -23.6 | -23.5 |
| -20.1 | -19.6 | -19.2 | -18.8 | -18.9 | -19.5 | -19.5 | -19.2 | -19.1 | -18.9 | -17.4 | -22.9 | -21.8 | -21.1 | -19.5 | -18.9 | -19.2 | -19.3 | -19.3 | -20.3 | -21.4 | -21.1 | -20.6 | -19.9 | -19.7 | -19.1 | -18.6 | -18.6 | -18.1 | -20.0 | -19.7 | -20.8 | -22.7 | -21.6 | -20.2 | -19.8 |
| -15.3 | -14.9 | -14.6 | -14.3 | -14.0 | -13.7 | -13.4 | -13.1 | -12.9 | -12.9 | -11.5 | -15.3 | -14.5 | -13.4 | -11.1 | -10.2 | -9.8 | -9.5 | -8.9 | -9.9 | -10.8 | -10.6 | -10.2 | -10.5 | -10.9 | -11.0 | -11.2 | -11.2 | -11.6 | -12.0 | -12.5 | -13.0 | -14.4 | -15.0 | -14.6 | -14.4 |
| -9.2 | -8.7 | -8.3 | -8.1 | -8.0 | -8.3 | -8.2 | -8.4 | -8.3 | -8.3 | -8.5 | -8.7 | -7.1 | -5.0 | -3.7 | -3.5 | -3.4 | -2.5 | -2.3 | -2.6 | -2.9 | -3.6 | -3.7 | -4.0 | -4.1 | -4.0 | -4.6 | -5.0 | -5.0 | -5.6 | -6.7 | -7.1 | -7.0 | -7.9 | -8.8 | -9.2 |
| -2.6 | -2.0 | -1.7 | -1.8 | -2.0 | -2.4 | -2.9 | -3.0 | -3.1 | -3.2 | -3.2 | -1.8 | -1.4 | -1.1 | -0.9 | -0.6 | -0.7 | -1.4 | -1.1 | -0.8 | -1.3 | -1.2 | 1.4 | 3.5 | 1.0 | -0.7 | 3.1 | 5.4 | 5.4 | 3.2 | 2.9 | 3.4 | 0.5 | -1.1 | -2.2 | -2.8 |
| 0.5 | 0.5 | 0.9 | 2.2 | 4.7 | 5.6 | 5.6 | 5.1 | 7.3 | 6.9 | 4.4 | 6.1 | 1.3 | 1.1 | 1.2 | 5.1 | 10.9 | 19.8 | 23.4 | 24.4 | 23.6 | 25.1 | 25.9 | 24.8 | 18.5 | 20.3 | 27.9 | 30.5 | 29.2 | 27.1 | 26.0 | 24.6 | 22.2 | 19.1 | 7.3 | 0.4 |
| 7.5 | 6.6 | 6.3 | 7.8 | 10.0 | 11.9 | 14.8 | 17.2 | 17.7 | 15.7 | 12.3 | 11.1 | 12.4 | 13.8 | 16.1 | 19.5 | 21.8 | 23.6 | 25.0 | 25.7 | 26.0 | 27.3 | 29.2 | 29.8 | 30.4 | 31.0 | 30.9 | 30.1 | 28.7 | 27.0 | 25.3 | 23.2 | 21.0 | 17.5 | 10.2 | 8.1 |

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



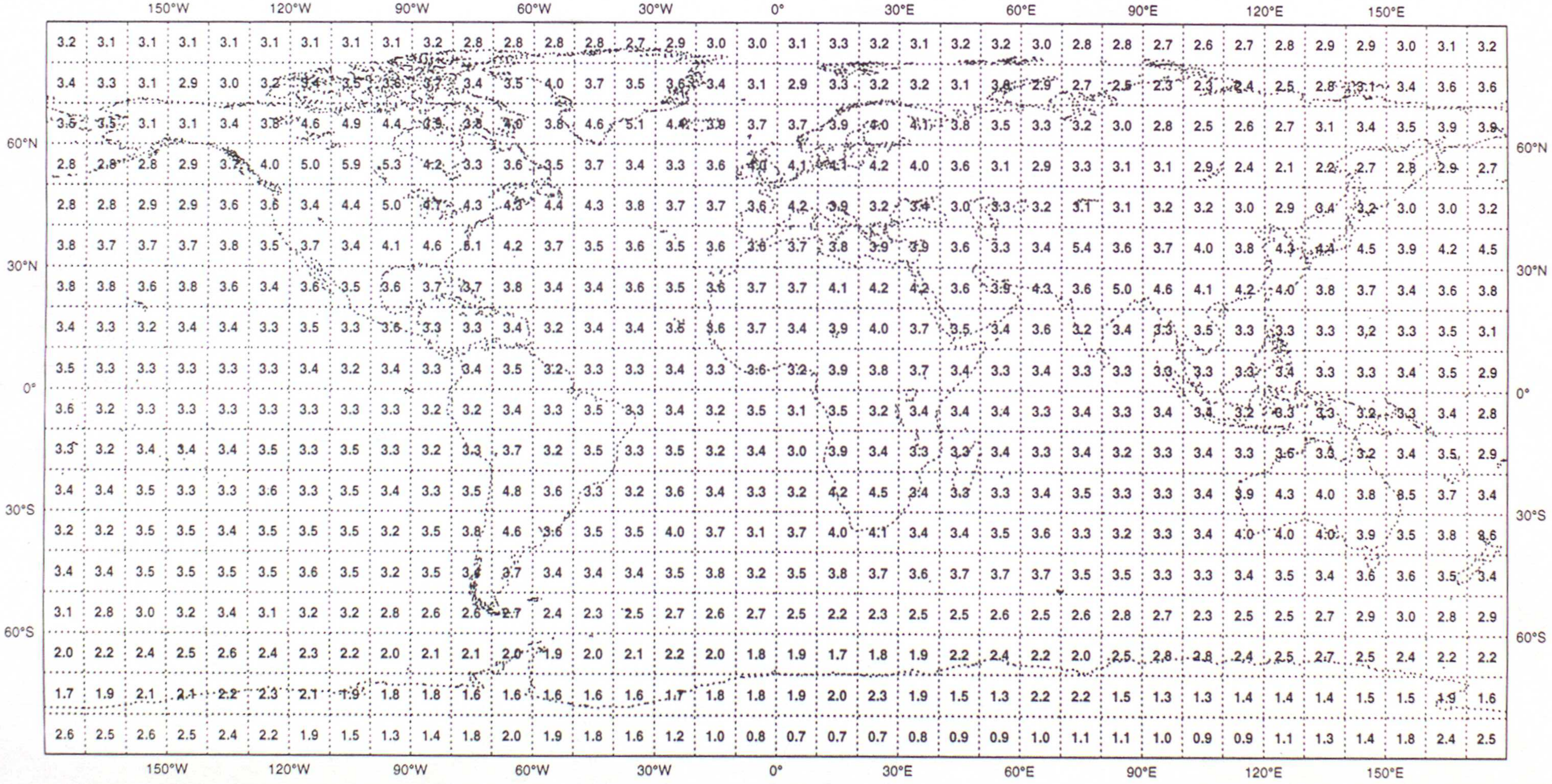
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.2 | 4.2 | 4.0 | 4.0 | 3.7 | 3.6 | 3.5 | 3.5 | 4.2 | 5.8 | 7.7 | 5.9 | 7.7 | 8.5 | 8.9 | 7.3 | 4.8 | 4.2 | 4.4 | 4.7 | 3.6 | 2.7 | 3.2 | 4.0 | 4.0 | 4.2 | 4.3 | 4.8 | 5.0 | 5.0 | 5.2 | 5.1 | 4.5 | 3.7 | 3.7 | 3.9 |
| 6.0 | 6.5 | 6.0 | 5.0 | 4.4 | 4.4 | 8.4 | 4.2 | 5.1 | 5.7 | 6.5 | 8.8 | 12.6 | 8.8 | 8.0 | 9.9 | 6.2 | 5.2 | 2.7 | 7.7 | 7.8 | 6.9 | 6.0 | 6.2 | 5.9 | 5.5 | 5.1 | 4.5 | 4.4 | 4.1 | 4.8 | 4.2 | 4.8 | 4.8 | 5.8 | 6.0 |
| 7.6 | 7.6 | 8.4 | 8.8 | 8.8 | 8.0 | 6.9 | 6.8 | 5.1 | 5.0 | 5.5 | 7.1 | 6.6 | 11.1 | 14.0 | 9.5 | 5.4 | 2.0 | 5.5 | 8.9 | 6.1 | 7.0 | 7.7 | 7.1 | 7.1 | 6.5 | 5.9 | 6.8 | 5.4 | 4.9 | 5.2 | 5.6 | 7.1 | 8.1 | 9.2 | 9.2 |
| 1.4 | 3.8 | 3.4 | 1.1 | 7.8 | 9.7 | 8.9 | 9.3 | 7.7 | 6.0 | 5.8 | 7.0 | 5.3 | 1.8 | 1.2 | 0.9 | 0.8 | 3.7 | 4.5 | 4.5 | 5.7 | 6.4 | 6.2 | 5.9 | 5.2 | 5.6 | 6.1 | 7.0 | 6.8 | 7.2 | 5.2 | 7.3 | 8.0 | 6.4 | 5.2 | 0.9 |
| 2.1 | 1.7 | 1.6 | 1.6 | 1.4 | 4.5 | 4.9 | 6.6 | 7.5 | 7.0 | 7.5 | 8.1 | 6.0 | 4.8 | 1.6 | 1.2 | 1.0 | 5.3 | 6.6 | 0.7 | 4.6 | 5.0 | 5.7 | 5.4 | 4.5 | 6.4 | 6.1 | 6.1 | 5.7 | 6.2 | 6.6 | 11.2 | 5.5 | 2.5 | 2.4 | 2.3 |
| 2.1 | 2.0 | 2.2 | 1.9 | 1.5 | 2.8 | 7.1 | 4.8 | 5.8 | 6.8 | 7.9 | 2.1 | 1.3 | 1.4 | 1.5 | 1.6 | 1.5 | 6.0 | 5.1 | 2.5 | 4.0 | 7.1 | 6.5 | 5.6 | 5.1 | 12.3 | 7.0 | 6.7 | 7.2 | 6.7 | 7.3 | 6.9 | 4.9 | 2.6 | 2.5 | 2.2 |
| 2.1 | 2.1 | 1.8 | 1.7 | 1.4 | 1.3 | 2.8 | 6.9 | 4.9 | 3.2 | 1.5 | 1.7 | 1.6 | 1.3 | 1.1 | 1.0 | 3.1 | 4.0 | 6.7 | 6.2 | 6.9 | 7.8 | 5.5 | 7.5 | 8.0 | 4.8 | 9.7 | 8.7 | 6.5 | 7.4 | 4.0 | 1.6 | 1.8 | 1.7 | 1.8 | 1.9 |
| 1.0 | 1.0 | 1.1 | 1.1 | 1.2 | 1.3 | 1.6 | 3.0 | 4.5 | 2.5 | 1.8 | 1.3 | 0.8 | 0.8 | 0.9 | 1.1 | 2.5 | 3.2 | 5.8 | 7.1 | 8.9 | 7.1 | 6.5 | 4.5 | 1.1 | 2.7 | 2.3 | 2.4 | 4.1 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.4 | 1.1 |
| 2.2 | 1.8 | 1.7 | 1.7 | 1.6 | 1.4 | 1.3 | 1.4 | 1.6 | 1.9 | 3.3 | 3.5 | 2.3 | 1.4 | 1.3 | 1.5 | 1.8 | 2.1 | 2.8 | 6.0 | 6.4 | 6.3 | 5.1 | 1.5 | 1.9 | 1.9 | 2.0 | 1.9 | 1.8 | 2.0 | 1.6 | 1.8 | 2.0 | 2.0 | 2.0 | 1.8 |
| 1.6 | 1.5 | 1.5 | 1.4 | 1.1 | 0.9 | 0.9 | 1.0 | 1.1 | 1.3 | 2.9 | 2.5 | 2.2 | 2.9 | 2.5 | 1.4 | 1.2 | 1.4 | 1.3 | 2.0 | 2.8 | 4.1 | 1.7 | 1.6 | 1.6 | 1.8 | 1.6 | 1.7 | 2.0 | 1.8 | 1.5 | 2.1 | 2.2 | 1.8 | 1.7 | 1.3 |
| 1.7 | 2.0 | 1.6 | 1.6 | 1.5 | 1.0 | 0.7 | 0.6 | 0.7 | 0.7 | 4.2 | 6.4 | 2.7 | 3.1 | 1.7 | 1.0 | 0.8 | 1.0 | 1.1 | 5.2 | 4.7 | 3.2 | 2.5 | 1.8 | 1.6 | 1.6 | 1.4 | 1.3 | 1.1 | 1.5 | 3.7 | 3.3 | 2.5 | 1.6 | 1.7 | 1.6 |
| 1.6 | 1.6 | 1.5 | 1.8 | 1.8 | 1.6 | 1.3 | 0.9 | 0.8 | 0.7 | 3.1 | 11.1 | 4.0 | 2.5 | 1.9 | 1.9 | 1.5 | 1.3 | 0.9 | 6.9 | 9.0 | 3.3 | 2.0 | 1.7 | 1.7 | 1.5 | 1.3 | 1.1 | 1.3 | 6.4 | 8.8 | 7.0 | 4.6 | 1.7 | 1.4 | 1.6 |
| 1.5 | 1.6 | 1.6 | 1.6 | 1.7 | 2.0 | 2.0 | 2.0 | 2.0 | 1.8 | 4.9 | 8.8 | 3.4 | 2.0 | 1.9 | 2.1 | 2.5 | 2.7 | 2.5 | 2.9 | 5.0 | 1.9 | 2.0 | 1.9 | 2.1 | 1.9 | 1.9 | 2.3 | 1.9 | 5.1 | 5.2 | 6.0 | 6.0 | 2.0 | 1.7 | 2.1 |
| 2.0 | 1.5 | 1.5 | 1.5 | 1.7 | 1.9 | 1.9 | 1.8 | 1.9 | 2.0 | 4.8 | 5.4 | 2.5 | 2.6 | 3.2 | 3.0 | 3.0 | 2.9 | 2.7 | 3.9 | 4.4 | 3.8 | 3.7 | 3.9 | 3.7 | 3.5 | 2.7 | 2.3 | 2.2 | 2.1 | 2.0 | 1.9 | 2.4 | 2.4 | 2.2 | 2.4 |
| 1.9 | 2.3 | 2.6 | 2.7 | 2.2 | 1.8 | 1.5 | 1.4 | 1.2 | 1.2 | 2.0 | 2.3 | 2.1 | 1.6 | 1.2 | 1.5 | 1.3 | 1.1 | 1.1 | 1.0 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 1.2 | 1.4 | 1.4 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 1.7 | 1.3 |
| 1.7 | 1.4 | 1.2 | 1.2 | 1.3 | 1.7 | 1.8 | 1.8 | 1.9 | 1.9 | 2.1 | 3.5 | 1.1 | 0.7 | 0.6 | 0.7 | 0.7 | 1.3 | 1.1 | 1.1 | 1.2 | 2.6 | 6.6 | 8.0 | 5.8 | 2.9 | 7.6 | 9.3 | 9.4 | 8.2 | 8.4 | 8.8 | 6.2 | 3.8 | 2.0 | 2.2 |
| 1.8 | 2.0 | 2.7 | 4.2 | 6.5 | 7.2 | 7.2 | 6.9 | 7.2 | 7.2 | 4.9 | 4.8 | 3.0 | 3.5 | 3.6 | 7.0 | 9.2 | 9.4 | 9.0 | 8.9 | 10.2 | 7.7 | 5.9 | 5.1 | 8.2 | 8.0 | 5.5 | 4.8 | 4.9 | 5.9 | 6.0 | 5.6 | 5.6 | 5.7 | 7.8 | 1.8 |
| 8.3 | 7.3 | 7.0 | 6.8 | 6.4 | 6.1 | 5.8 | 4.9 | 4.3 | 4.3 | 5.8 | 6.7 | 6.9 | 6.8 | 6.6 | 4.8 | 3.9 | 3.3 | 2.8 | 2.7 | 2.7 | 3.1 | 3.3 | 3.3 | 3.5 | 3.8 | 3.9 | 3.6 | 3.4 | 3.7 | 4.3 | 4.6 | 4.9 | 6.4 | 8.9 | 8.8 |

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



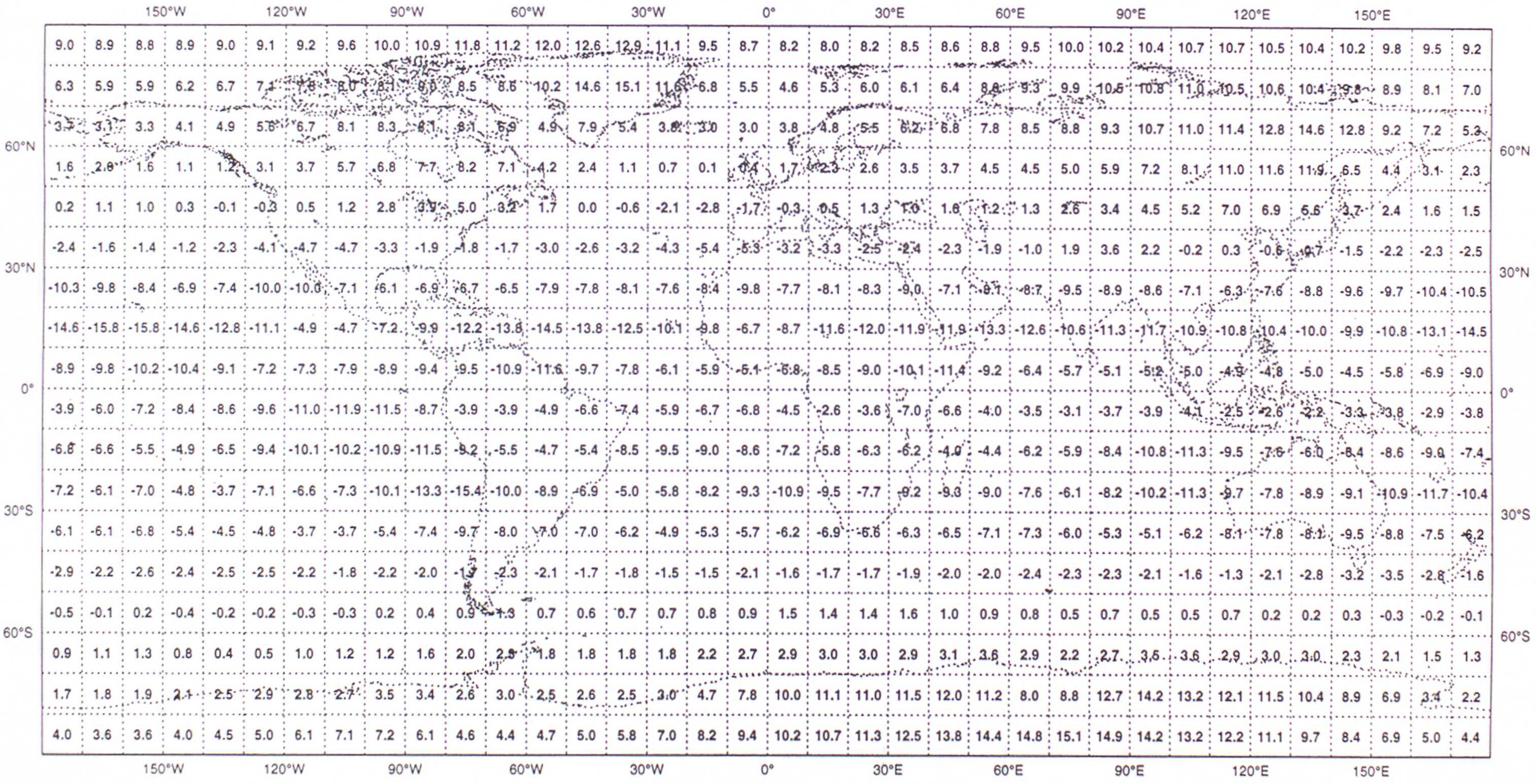
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14.7 | 14.7 | 14.9 | 15.0 | 15.3 | 15.5 | 15.7 | 16.1 | 16.5 | 17.2 | 17.7 | 17.5 | 17.9 | 18.2 | 18.4 | 17.7 | 16.8 | 16.3 | 15.9 | 15.7 | 15.8 | 15.9 | 16.0 | 16.1 | 16.6 | 16.9 | 17.0 | 17.1 | 17.1 | 16.9 | 16.6 | 16.2 | 15.8 | 15.4 | 15.0 | 14.8 |
| 11.0 | 10.9 | 10.9 | 11.4 | 12.1 | 12.8 | 13.7 | 14.4 | 14.8 | 15.6 | 15.4 | 15.3 | 15.7 | 17.7 | 17.9 | 16.3 | 13.6 | 12.4 | 11.4 | 12.2 | 13.3 | 13.3 | 13.5 | 14.7 | 15.6 | 16.0 | 16.8 | 16.4 | 16.4 | 15.9 | 15.8 | 15.2 | 14.3 | 13.3 | 12.2 | 11.5 |
| 8.2 | 7.2 | 7.1 | 7.9 | 9.2 | 10.3 | 11.9 | 13.7 | 14.4 | 14.6 | 14.3 | 13.2 | 10.3 | 12.2 | 8.8 | 7.5 | 7.0 | 6.5 | 7.0 | 9.5 | 11.2 | 11.6 | 11.9 | 12.8 | 13.4 | 13.9 | 14.3 | 15.3 | 15.7 | 15.7 | 16.1 | 16.2 | 14.5 | 12.2 | 10.4 | 9.1 |
| 4.8 | 4.6 | 3.7 | 2.4 | 2.7 | 5.4 | 7.1 | 10.0 | 11.8 | 12.9 | 13.3 | 12.0 | 8.4 | 5.7 | 3.9 | 2.8 | 2.3 | 3.4 | 4.8 | 5.8 | 6.6 | 7.6 | 7.8 | 8.7 | 8.9 | 9.5 | 10.1 | 11.4 | 12.6 | 14.6 | 14.9 | 14.4 | 10.9 | 8.4 | 6.8 | 6.0 |
| 2.9 | 3.5 | 2.5 | 1.0 | -0.6 | -0.5 | 2.0 | 4.2 | 6.7 | 8.1 | 9.1 | 6.8 | 4.3 | 1.3 | -0.3 | -0.8 | -0.2 | 1.5 | 3.1 | 2.9 | 3.9 | 3.8 | 4.6 | 4.7 | 5.0 | 6.4 | 8.0 | 9.5 | 10.4 | 11.6 | 11.4 | 10.0 | 8.0 | 5.9 | 4.7 | 4.7 |
| -1.5 | -0.9 | -1.3 | -2.5 | -4.0 | -4.5 | -2.3 | -0.7 | 0.2 | 1.2 | -0.9 | -2.3 | -3.9 | -4.7 | -4.2 | -4.1 | -3.1 | -1.0 | -0.6 | -2.3 | -1.7 | -0.3 | 1.5 | 1.6 | 2.0 | 4.0 | 6.4 | 5.4 | 3.2 | 4.9 | 3.0 | 1.7 | 0.1 | -0.9 | -1.7 | -1.1 |
| -8.6 | -7.9 | -7.7 | -7.5 | -7.4 | -7.4 | -7.1 | -6.2 | -6.2 | -7.1 | -8.2 | -8.0 | -8.6 | -7.9 | -6.8 | -6.3 | -5.3 | -5.1 | -5.8 | -7.1 | -6.6 | -6.7 | -5.0 | -5.5 | -5.7 | -6.6 | -5.1 | -5.4 | -5.1 | -4.3 | -6.6 | -7.7 | -8.7 | -8.8 | -9.1 | -9.0 |
| -11.5 | -11.8 | -11.6 | -10.9 | -10.2 | -10.0 | -9.5 | -10.7 | -10.0 | -10.8 | -11.6 | -11.0 | -11.0 | -10.0 | -9.1 | -8.8 | -9.1 | -9.5 | -11.0 | -11.9 | -11.4 | -11.2 | -9.7 | -10.3 | -10.6 | -10.9 | -11.0 | -11.2 | -11.0 | -10.9 | -11.2 | -11.6 | -12.0 | -11.8 | -11.6 | -12.5 |
| -11.5 | -12.7 | -12.5 | -12.0 | -11.5 | -11.2 | -10.9 | -11.4 | -11.4 | -11.8 | -11.8 | -11.6 | -11.6 | -11.2 | -10.9 | -10.5 | -11.2 | -10.8 | -12.1 | -12.1 | -12.3 | -11.4 | -11.2 | -11.3 | -11.4 | -11.8 | -11.6 | -11.7 | -11.5 | -11.6 | -11.6 | -11.8 | -12.0 | -12.1 | -11.8 | -13.2 |
| -11.6 | -12.8 | -12.6 | -12.1 | -11.6 | -11.3 | -11.2 | -11.2 | -11.4 | -11.5 | -11.4 | -11.8 | -11.6 | -11.5 | -11.2 | -10.5 | -11.2 | -10.7 | -11.6 | -10.9 | -11.0 | -11.1 | -11.7 | -11.3 | -11.5 | -11.5 | -11.8 | -11.6 | -11.6 | -11.5 | -12.1 | -11.8 | -12.1 | -12.7 | -12.2 | -13.4 |
| -12.5 | -13.0 | -12.0 | -11.3 | -10.9 | -10.2 | -10.0 | -9.6 | -10.6 | -11.3 | -11.1 | -11.7 | -11.7 | -11.1 | -11.4 | -10.4 | -11.0 | -10.6 | -11.5 | -11.6 | -11.8 | -11.5 | -11.6 | -11.5 | -11.9 | -11.3 | -11.9 | -11.8 | -11.8 | -12.8 | -12.4 | -12.1 | -12.6 | -12.4 | -12.3 | -13.3 |
| -10.3 | -10.1 | -10.1 | -10.0 | -9.7 | -9.0 | -8.6 | -7.7 | -8.9 | -9.8 | -10.5 | -11.3 | -11.1 | -10.3 | -10.6 | -10.0 | -10.4 | -10.3 | -10.7 | -11.4 | -12.4 | -11.6 | -11.3 | -10.6 | -10.5 | -9.7 | -10.0 | -10.1 | -10.0 | -12.2 | -12.3 | -12.3 | -12.2 | -10.4 | -10.0 | -10.7 |
| -7.0 | -6.3 | -7.0 | -7.2 | -7.3 | -7.0 | -6.9 | -5.9 | -6.6 | -6.8 | -6.9 | -9.4 | -7.8 | -7.6 | -7.4 | -7.0 | -7.2 | -7.6 | -6.8 | -7.8 | -8.3 | -8.3 | -8.2 | -7.9 | -8.0 | -7.0 | -7.0 | -6.6 | -6.3 | -7.7 | -7.7 | -8.3 | -9.0 | -7.8 | -7.1 | -6.3 |
| -3.8 | -3.3 | -3.7 | -4.1 | -4.1 | -4.1 | -3.8 | -3.3 | -3.2 | -3.0 | -2.4 | -3.7 | -2.7 | -2.7 | -2.4 | -1.9 | -1.6 | -2.1 | -0.7 | -1.2 | -1.3 | -1.4 | -2.0 | -2.7 | -2.9 | -2.6 | -2.3 | -2.0 | -2.0 | -2.4 | -3.0 | -3.4 | -3.9 | -4.2 | -3.8 | -3.0 |
| -1.1 | -0.6 | -0.6 | -1.0 | -1.0 | -0.8 | -0.4 | -0.5 | 0.2 | 0.5 | 0.5 | 0.7 | 1.0 | 1.1 | 1.1 | 1.3 | 1.9 | 2.4 | 2.9 | 2.6 | 2.5 | 2.3 | 1.9 | 1.5 | 1.4 | 1.1 | 1.3 | 1.3 | 1.1 | 1.1 | 0.3 | 0.0 | 0.0 | -0.8 | -0.9 | -0.7 |
| 1.9 | 2.0 | 1.8 | 1.5 | 1.2 | 1.3 | 1.6 | 1.9 | 2.3 | 2.3 | 2.3 | 2.8 | 2.6 | 2.5 | 2.6 | 2.9 | 3.7 | 4.0 | 3.8 | 3.6 | 3.5 | 3.4 | 3.8 | 4.0 | 3.3 | 2.7 | 3.5 | 3.8 | 3.7 | 3.3 | 3.2 | 3.2 | 2.4 | 1.8 | 1.5 | 1.6 |
| 2.7 | 2.7 | 2.6 | 2.7 | 3.0 | 3.2 | 3.4 | 3.5 | 4.1 | 4.2 | 3.7 | 4.0 | 3.3 | 3.4 | 3.7 | 4.5 | 5.8 | 7.7 | 8.6 | 9.0 | 8.9 | 9.2 | 9.4 | 9.0 | 7.3 | 7.7 | 9.7 | 10.4 | 9.9 | 9.3 | 9.0 | 8.5 | 7.6 | 6.5 | 4.1 | 2.9 |
| 4.1 | 3.8 | 3.7 | 4.0 | 4.4 | 4.9 | 5.7 | 6.4 | 6.6 | 6.2 | 5.6 | 5.3 | 5.6 | 5.9 | 6.4 | 7.1 | 7.7 | 8.2 | 8.6 | 8.8 | 9.0 | 9.5 | 10.0 | 10.3 | 10.4 | 10.5 | 10.5 | 10.2 | 9.7 | 9.2 | 8.6 | 8.0 | 7.3 | 6.3 | 4.8 | 4.3 |

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



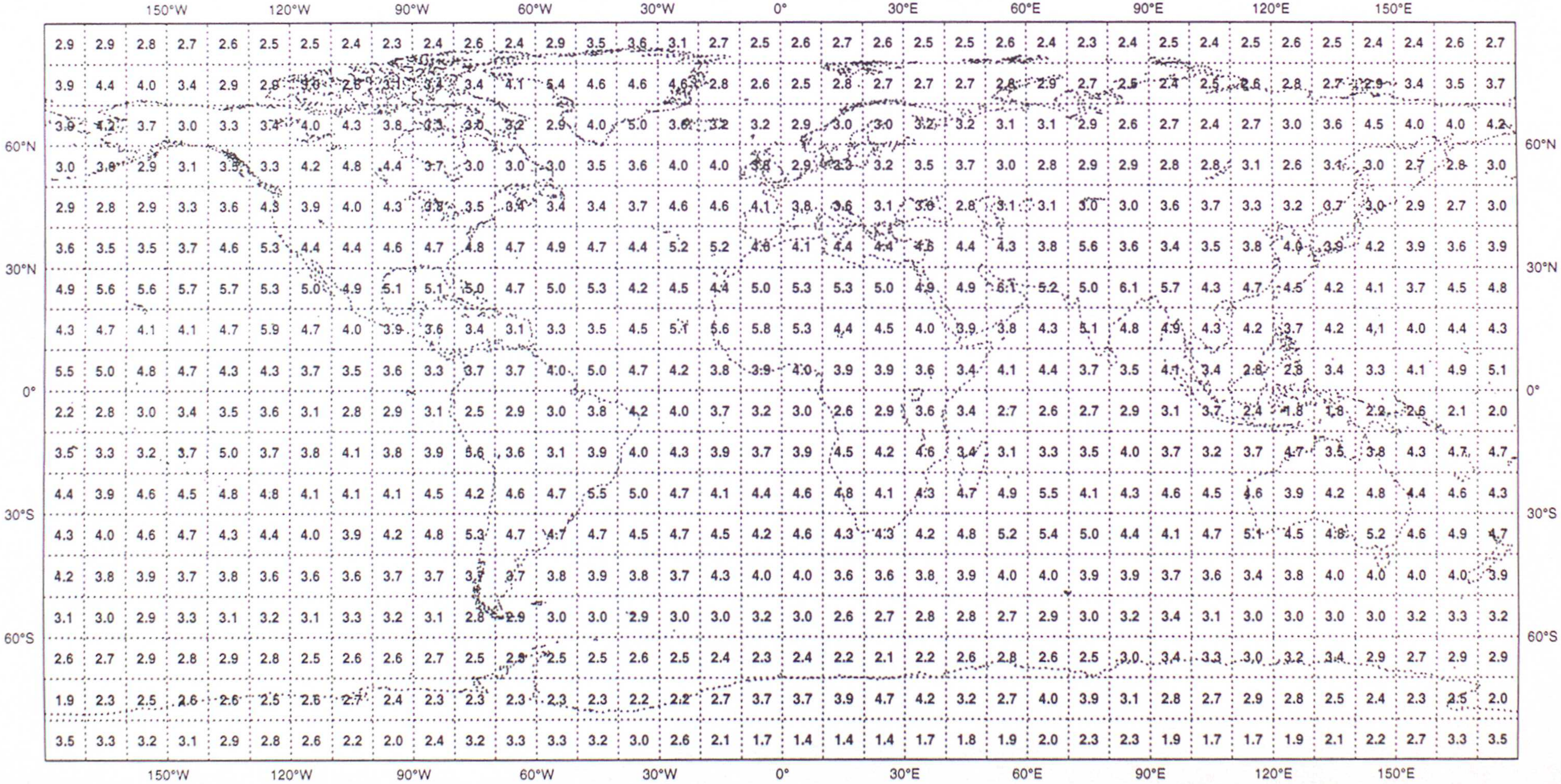
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.2 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.1 | 3.2 | 2.8 | 2.8 | 2.8 | 2.8 | 2.7 | 2.9 | 3.0 | 3.0 | 3.1 | 3.3 | 3.2 | 3.1 | 3.2 | 3.2 | 3.0 | 2.8 | 2.8 | 2.7 | 2.6 | 2.7 | 2.8 | 2.9 | 2.9 | 3.0 | 3.1 | 3.2 |
| 3.4 | 3.3 | 3.1 | 2.9 | 3.0 | 3.2 | 3.4 | 3.5 | 3.6 | 3.7 | 3.4 | 3.5 | 4.0 | 3.7 | 3.5 | 3.6 | 3.4 | 3.1 | 2.9 | 3.3 | 3.2 | 3.2 | 3.1 | 3.8 | 2.9 | 2.7 | 2.5 | 2.3 | 2.3 | 2.4 | 2.5 | 2.8 | 3.1 | 3.4 | 3.6 | 3.6 |
| 3.5 | 3.5 | 3.1 | 3.1 | 3.4 | 3.8 | 4.6 | 4.9 | 4.4 | 3.9 | 3.8 | 4.0 | 3.8 | 4.6 | 5.1 | 4.4 | 3.9 | 3.7 | 3.7 | 3.9 | 4.0 | 4.1 | 3.8 | 3.5 | 3.3 | 3.2 | 3.0 | 2.8 | 2.5 | 2.6 | 2.7 | 3.1 | 3.4 | 3.5 | 3.9 | 3.9 |
| 2.8 | 2.8 | 2.8 | 2.9 | 3.7 | 4.0 | 5.0 | 5.9 | 5.3 | 4.2 | 3.3 | 3.6 | 3.5 | 3.7 | 3.4 | 3.3 | 3.6 | 4.0 | 4.1 | 4.1 | 4.2 | 4.0 | 3.6 | 3.1 | 2.9 | 3.3 | 3.1 | 3.1 | 2.9 | 2.4 | 2.1 | 2.2 | 2.7 | 2.8 | 2.9 | 2.7 |
| 2.8 | 2.8 | 2.9 | 2.9 | 3.6 | 3.6 | 3.4 | 4.4 | 5.0 | 4.7 | 4.3 | 4.3 | 4.4 | 4.3 | 3.8 | 3.7 | 3.7 | 3.6 | 4.2 | 3.9 | 3.2 | 3.4 | 3.0 | 3.3 | 3.2 | 3.1 | 3.1 | 3.2 | 3.2 | 3.0 | 2.9 | 3.4 | 3.2 | 3.0 | 3.0 | 3.2 |
| 3.8 | 3.7 | 3.7 | 3.7 | 3.8 | 3.5 | 3.7 | 3.4 | 4.1 | 4.6 | 5.1 | 4.2 | 3.7 | 3.5 | 3.6 | 3.5 | 3.6 | 3.6 | 3.7 | 3.8 | 3.9 | 3.9 | 3.6 | 3.3 | 3.4 | 5.4 | 3.6 | 3.7 | 4.0 | 3.8 | 4.3 | 4.4 | 4.5 | 3.9 | 4.2 | 4.5 |
| 3.8 | 3.8 | 3.6 | 3.8 | 3.6 | 3.4 | 3.6 | 3.5 | 3.6 | 3.7 | 3.7 | 3.8 | 3.4 | 3.4 | 3.6 | 3.5 | 3.6 | 3.7 | 3.7 | 4.1 | 4.2 | 4.2 | 3.6 | 3.9 | 4.3 | 3.6 | 5.0 | 4.6 | 4.1 | 4.2 | 4.0 | 3.8 | 3.7 | 3.4 | 3.6 | 3.8 |
| 3.4 | 3.3 | 3.2 | 3.4 | 3.4 | 3.3 | 3.5 | 3.3 | 3.6 | 3.3 | 3.3 | 3.4 | 3.2 | 3.4 | 3.4 | 3.5 | 3.6 | 3.7 | 3.4 | 3.9 | 4.0 | 3.7 | 3.5 | 3.4 | 3.6 | 3.2 | 3.4 | 3.3 | 3.5 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.5 | 3.1 |
| 3.5 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.4 | 3.2 | 3.4 | 3.3 | 3.4 | 3.5 | 3.2 | 3.3 | 3.3 | 3.4 | 3.3 | 3.6 | 3.2 | 3.9 | 3.8 | 3.7 | 3.4 | 3.3 | 3.4 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.4 | 3.3 | 3.3 | 3.4 | 3.5 | 2.9 |
| 3.6 | 3.2 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.3 | 3.2 | 3.2 | 3.4 | 3.3 | 3.5 | 3.3 | 3.4 | 3.2 | 3.5 | 3.1 | 3.5 | 3.2 | 3.4 | 3.4 | 3.4 | 3.3 | 3.4 | 3.3 | 3.4 | 3.4 | 3.2 | 3.3 | 3.3 | 3.2 | 3.3 | 3.4 | 2.8 |
| 3.3 | 3.2 | 3.4 | 3.4 | 3.4 | 3.5 | 3.3 | 3.5 | 3.3 | 3.2 | 3.3 | 3.7 | 3.2 | 3.5 | 3.3 | 3.5 | 3.2 | 3.4 | 3.0 | 3.9 | 3.4 | 3.3 | 3.3 | 3.4 | 3.3 | 3.4 | 3.2 | 3.3 | 3.4 | 3.3 | 3.6 | 3.3 | 3.2 | 3.4 | 3.5 | 2.9 |
| 3.4 | 3.4 | 3.5 | 3.3 | 3.3 | 3.6 | 3.3 | 3.5 | 3.4 | 3.3 | 3.5 | 4.8 | 3.6 | 3.3 | 3.2 | 3.6 | 3.4 | 3.3 | 3.2 | 4.2 | 4.5 | 3.4 | 3.3 | 3.3 | 3.4 | 3.5 | 3.3 | 3.3 | 3.4 | 3.9 | 4.3 | 4.0 | 3.8 | 3.5 | 3.7 | 3.4 |
| 3.2 | 3.2 | 3.5 | 3.5 | 3.4 | 3.5 | 3.5 | 3.5 | 3.2 | 3.5 | 3.8 | 4.6 | 3.6 | 3.5 | 3.5 | 4.0 | 3.7 | 3.1 | 3.7 | 4.0 | 4.1 | 3.4 | 3.4 | 3.5 | 3.6 | 3.3 | 3.2 | 3.3 | 3.4 | 4.0 | 4.0 | 4.0 | 3.9 | 3.5 | 3.8 | 3.6 |
| 3.4 | 3.4 | 3.5 | 3.5 | 3.5 | 3.5 | 3.6 | 3.5 | 3.2 | 3.5 | 3.4 | 3.7 | 3.4 | 3.4 | 3.4 | 3.5 | 3.8 | 3.2 | 3.5 | 3.8 | 3.7 | 3.6 | 3.7 | 3.7 | 3.7 | 3.5 | 3.5 | 3.3 | 3.3 | 3.4 | 3.5 | 3.4 | 3.6 | 3.6 | 3.5 | 3.4 |
| 3.1 | 2.8 | 3.0 | 3.2 | 3.4 | 3.1 | 3.2 | 3.2 | 2.8 | 2.6 | 2.6 | 2.7 | 2.4 | 2.3 | 2.5 | 2.7 | 2.6 | 2.7 | 2.5 | 2.2 | 2.3 | 2.5 | 2.5 | 2.6 | 2.5 | 2.6 | 2.8 | 2.7 | 2.3 | 2.5 | 2.5 | 2.7 | 2.9 | 3.0 | 2.8 | 2.9 |
| 2.0 | 2.2 | 2.4 | 2.5 | 2.6 | 2.4 | 2.3 | 2.2 | 2.0 | 2.1 | 2.1 | 2.0 | 1.9 | 2.0 | 2.1 | 2.2 | 2.0 | 1.8 | 1.9 | 1.7 | 1.8 | 1.9 | 2.2 | 2.4 | 2.2 | 2.0 | 2.5 | 2.8 | 2.8 | 2.4 | 2.5 | 2.7 | 2.5 | 2.4 | 2.2 | 2.2 |
| 1.7 | 1.9 | 2.1 | 2.1 | 2.2 | 2.3 | 2.1 | 1.9 | 1.8 | 1.8 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.7 | 1.8 | 1.8 | 1.9 | 2.0 | 2.3 | 1.9 | 1.5 | 1.3 | 2.2 | 2.2 | 1.5 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 1.5 | 1.5 | 1.9 | 1.6 |
| 2.6 | 2.5 | 2.6 | 2.5 | 2.4 | 2.2 | 1.9 | 1.5 | 1.3 | 1.4 | 1.8 | 2.0 | 1.9 | 1.8 | 1.6 | 1.2 | 1.0 | 0.8 | 0.7 | 0.7 | 0.7 | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.1 | 1.0 | 0.9 | 0.9 | 1.1 | 1.3 | 1.4 | 1.8 | 2.4 | 2.5 |

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



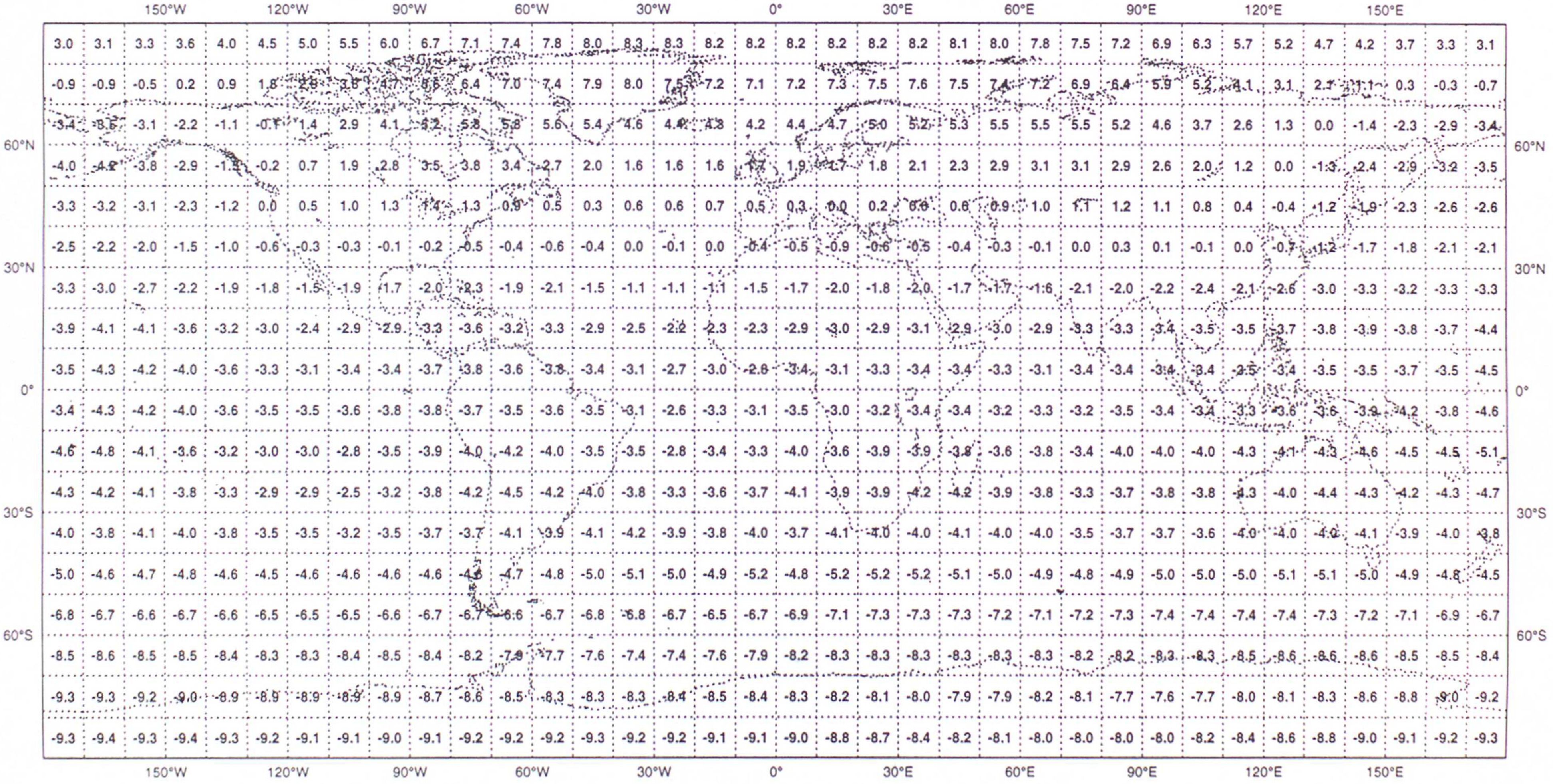
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9.0 | 8.9 | 8.8 | 8.9 | 9.0 | 9.1 | 9.2 | 9.6 | 10.0 | 10.9 | 11.8 | 11.2 | 12.0 | 12.6 | 12.9 | 11.1 | 9.5 | 8.7 | 8.2 | 8.0 | 8.2 | 8.5 | 8.6 | 8.8 | 9.5 | 10.0 | 10.2 | 10.4 | 10.7 | 10.7 | 10.5 | 10.4 | 10.2 | 9.8 | 9.5 | 9.2 |
| 6.3 | 5.9 | 5.9 | 6.2 | 6.7 | 7.1 | 7.6 | 8.0 | 8.1 | 9.0 | 8.5 | 8.6 | 10.2 | 14.6 | 15.1 | 11.6 | 6.8 | 5.5 | 4.6 | 5.3 | 6.0 | 6.1 | 6.4 | 8.8 | 9.3 | 9.9 | 10.6 | 10.8 | 11.0 | 10.5 | 10.6 | 10.4 | 9.8 | 8.9 | 8.1 | 7.0 |
| 3.7 | 3.1 | 3.3 | 4.1 | 4.9 | 5.6 | 6.7 | 8.1 | 8.3 | 8.1 | 8.1 | 5.9 | 4.9 | 7.9 | 5.4 | 3.8 | 3.0 | 3.0 | 3.8 | 4.8 | 5.5 | 6.2 | 6.8 | 7.8 | 8.5 | 8.8 | 9.3 | 10.7 | 11.0 | 11.4 | 12.8 | 14.6 | 12.8 | 9.2 | 7.2 | 5.3 |
| 1.6 | 2.8 | 1.6 | 1.1 | 1.2 | 3.1 | 3.7 | 5.7 | 6.8 | 7.7 | 8.2 | 7.1 | 4.2 | 2.4 | 1.1 | 0.7 | 0.1 | 0.4 | 1.7 | 2.3 | 2.6 | 3.5 | 3.7 | 4.5 | 4.5 | 5.0 | 5.9 | 7.2 | 8.1 | 11.0 | 11.6 | 11.9 | 6.5 | 4.4 | 3.1 | 2.3 |
| 0.2 | 1.1 | 1.0 | 0.3 | -0.1 | -0.3 | 0.5 | 1.2 | 2.8 | 3.9 | 5.0 | 3.2 | 1.7 | 0.0 | -0.6 | -2.1 | -2.8 | -1.7 | -0.3 | 0.5 | 1.3 | 1.0 | 1.6 | 1.2 | 1.3 | 2.6 | 3.4 | 4.5 | 5.2 | 7.0 | 6.9 | 5.6 | 3.7 | 2.4 | 1.6 | 1.5 |
| -2.4 | -1.6 | -1.4 | -1.2 | -2.3 | -4.1 | -4.7 | -4.7 | -3.3 | -1.9 | -1.8 | -1.7 | -3.0 | -2.6 | -3.2 | -4.3 | -5.4 | -5.3 | -3.2 | -3.3 | -2.5 | -2.4 | -2.3 | -1.9 | -1.0 | 1.9 | 3.6 | 2.2 | -0.2 | 0.3 | -0.6 | -0.7 | -1.5 | -2.2 | -2.3 | -2.5 |
| -10.3 | -9.8 | -8.4 | -6.9 | -7.4 | -10.0 | -10.0 | -7.1 | -6.1 | -6.9 | -6.7 | -6.5 | -7.9 | -7.8 | -8.1 | -7.6 | -8.4 | -9.8 | -7.7 | -8.1 | -8.3 | -9.0 | -7.1 | -8.1 | -8.7 | -9.5 | -8.9 | -8.6 | -7.1 | -6.3 | -7.6 | -8.8 | -9.6 | -9.7 | -10.4 | -10.5 |
| -14.6 | -15.8 | -15.8 | -14.6 | -12.8 | -11.1 | -4.9 | -4.7 | -7.2 | -9.9 | -12.2 | -13.8 | -14.5 | -13.8 | -12.5 | -10.1 | -9.8 | -6.7 | -8.7 | -11.6 | -12.0 | -11.9 | -11.9 | -13.3 | -12.6 | -10.6 | -11.3 | -11.7 | -10.9 | -10.8 | -10.4 | -10.0 | -9.9 | -10.8 | -13.1 | -14.5 |
| -8.9 | -9.8 | -10.2 | -10.4 | -9.1 | -7.2 | -7.3 | -7.9 | -8.9 | -9.4 | -9.5 | -10.9 | -11.6 | -9.7 | -7.8 | -6.1 | -5.9 | -5.1 | -6.8 | -8.5 | -9.0 | -10.1 | -11.4 | -9.2 | -6.4 | -5.7 | -5.1 | -5.2 | -5.0 | -4.9 | -4.8 | -5.0 | -4.5 | -5.8 | -6.9 | -9.0 |
| -3.9 | -6.0 | -7.2 | -8.4 | -8.6 | -9.6 | -11.0 | -11.9 | -11.5 | -8.7 | -3.9 | -3.9 | -4.9 | -6.6 | -7.4 | -5.9 | -6.7 | -6.8 | -4.5 | -2.6 | -3.6 | -7.0 | -6.6 | -4.0 | -3.5 | -3.1 | -3.7 | -3.9 | -4.1 | -2.5 | -2.6 | -2.2 | -3.3 | -3.8 | -2.9 | -3.8 |
| -6.8 | -6.6 | -5.5 | -4.9 | -6.5 | -9.4 | -10.1 | -10.2 | -10.9 | -11.5 | -9.2 | -5.5 | -4.7 | -5.4 | -8.5 | -9.5 | -9.0 | -8.6 | -7.2 | -5.8 | -6.3 | -6.2 | -4.0 | -4.4 | -6.2 | -5.9 | -8.4 | -10.8 | -11.3 | -9.5 | -7.6 | -6.0 | -8.4 | -8.6 | -9.0 | -7.4 |
| -7.2 | -6.1 | -7.0 | -4.8 | -3.7 | -7.1 | -6.6 | -7.3 | -10.1 | -13.3 | -15.4 | -10.0 | -8.9 | -6.9 | -5.0 | -5.8 | -8.2 | -9.3 | -10.9 | -9.5 | -7.7 | -9.2 | -9.3 | -9.0 | -7.6 | -6.1 | -8.2 | -10.2 | -11.3 | -9.7 | -7.8 | -8.9 | -9.1 | -10.9 | -11.7 | -10.4 |
| -6.1 | -6.1 | -6.8 | -5.4 | -4.5 | -4.8 | -3.7 | -3.7 | -5.4 | -7.4 | -9.7 | -8.0 | -7.0 | -7.0 | -6.2 | -4.9 | -5.3 | -5.7 | -6.2 | -6.9 | -6.6 | -6.3 | -6.5 | -7.1 | -7.3 | -6.0 | -5.3 | -5.1 | -6.2 | -8.1 | -7.8 | -8.1 | -9.5 | -8.8 | -7.5 | -6.2 |
| -2.9 | -2.2 | -2.6 | -2.4 | -2.5 | -2.5 | -2.2 | -1.8 | -2.2 | -2.0 | -1.7 | -2.3 | -2.1 | -1.7 | -1.8 | -1.5 | -1.5 | -2.1 | -1.6 | -1.7 | -1.7 | -1.9 | -2.0 | -2.0 | -2.4 | -2.3 | -2.3 | -2.1 | -1.6 | -1.3 | -2.1 | -2.8 | -3.2 | -3.5 | -2.8 | -1.6 |
| -0.5 | -0.1 | 0.2 | -0.4 | -0.2 | -0.2 | -0.3 | -0.3 | 0.2 | 0.4 | 0.9 | 1.3 | 0.7 | 0.6 | 0.7 | 0.7 | 0.8 | 0.9 | 1.5 | 1.4 | 1.4 | 1.6 | 1.0 | 0.9 | 0.8 | 0.5 | 0.7 | 0.5 | 0.5 | 0.7 | 0.2 | 0.2 | 0.3 | -0.3 | -0.2 | -0.1 |
| 0.9 | 1.1 | 1.3 | 0.8 | 0.4 | 0.5 | 1.0 | 1.2 | 1.2 | 1.6 | 2.0 | 2.5 | 1.8 | 1.8 | 1.8 | 1.8 | 2.2 | 2.7 | 2.9 | 3.0 | 3.0 | 2.9 | 3.1 | 3.6 | 2.9 | 2.2 | 2.7 | 3.5 | 3.6 | 2.9 | 3.0 | 3.0 | 2.3 | 2.1 | 1.5 | 1.3 |
| 1.7 | 1.8 | 1.9 | 2.1 | 2.5 | 2.9 | 2.8 | 2.7 | 3.5 | 3.4 | 2.6 | 3.0 | 2.5 | 2.6 | 2.5 | 3.0 | 4.7 | 7.8 | 10.0 | 11.1 | 11.0 | 11.5 | 12.0 | 11.2 | 8.0 | 8.8 | 12.7 | 14.2 | 13.2 | 12.1 | 11.5 | 10.4 | 8.9 | 6.9 | 3.4 | 2.2 |
| 4.0 | 3.6 | 3.6 | 4.0 | 4.5 | 5.0 | 6.1 | 7.1 | 7.2 | 6.1 | 4.6 | 4.4 | 4.7 | 5.0 | 5.8 | 7.0 | 8.2 | 9.4 | 10.2 | 10.7 | 11.3 | 12.5 | 13.8 | 14.4 | 14.8 | 15.1 | 14.9 | 14.2 | 13.2 | 12.2 | 11.1 | 9.7 | 8.4 | 6.9 | 5.0 | 4.4 |

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



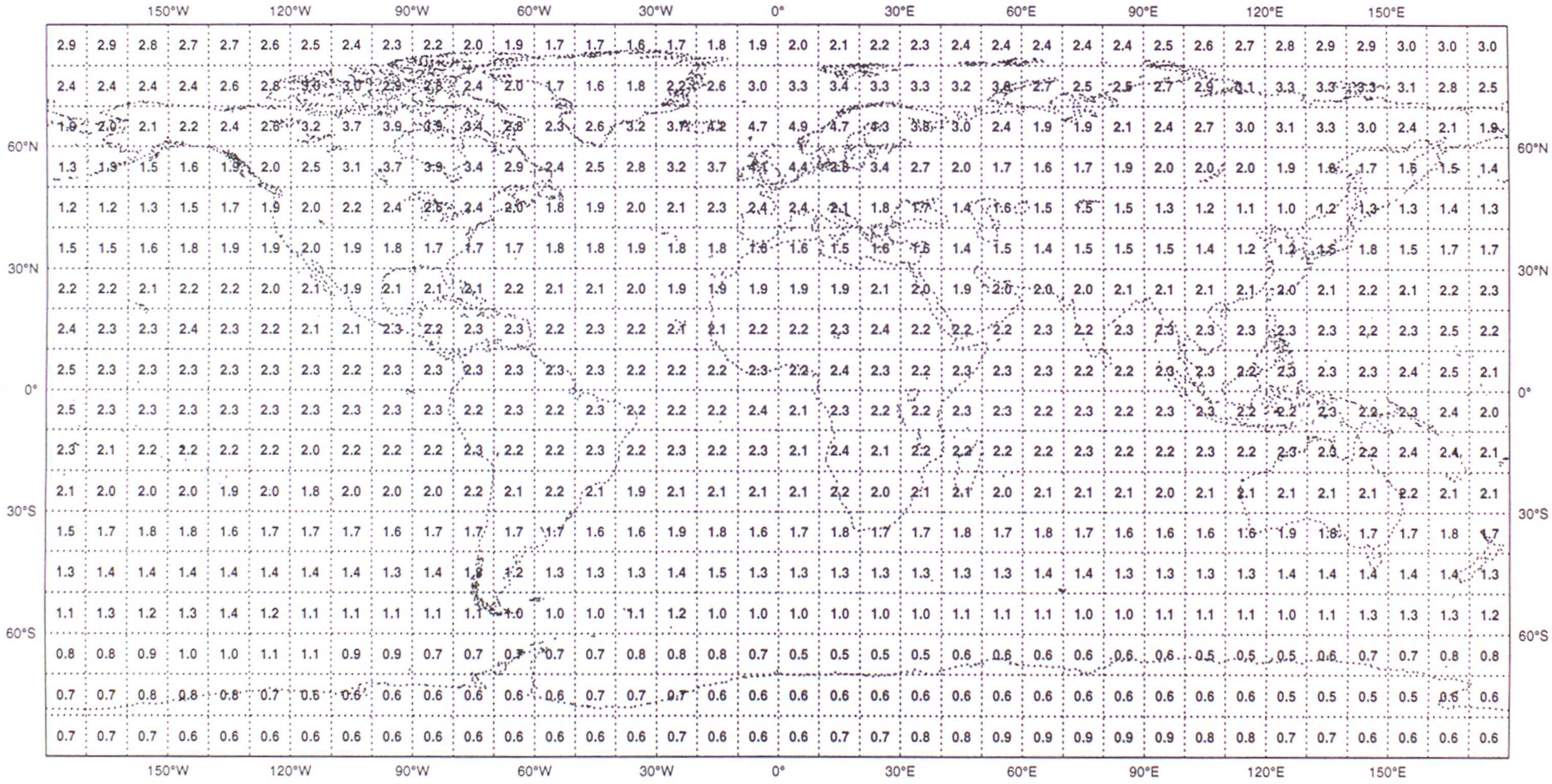
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.9 | 2.9 | 2.8 | 2.7 | 2.6 | 2.5 | 2.5 | 2.4 | 2.3 | 2.4 | 2.6 | 2.4 | 2.9 | 3.5 | 3.6 | 3.1 | 2.7 | 2.5 | 2.6 | 2.7 | 2.6 | 2.5 | 2.5 | 2.6 | 2.4 | 2.3 | 2.4 | 2.5 | 2.4 | 2.5 | 2.6 | 2.5 | 2.4 | 2.4 | 2.6 | 2.7 |
| 3.9 | 4.4 | 4.0 | 3.4 | 2.9 | 2.8 | 3.0 | 2.8 | 3.1 | 3.4 | 3.4 | 4.1 | 5.4 | 4.6 | 4.6 | 4.6 | 2.8 | 2.6 | 2.5 | 2.8 | 2.7 | 2.7 | 2.7 | 2.8 | 2.9 | 2.7 | 2.5 | 2.4 | 2.5 | 2.6 | 2.8 | 2.7 | 2.9 | 3.4 | 3.5 | 3.7 |
| 3.9 | 4.2 | 3.7 | 3.0 | 3.3 | 3.4 | 4.0 | 4.3 | 3.8 | 3.3 | 3.0 | 3.2 | 2.9 | 4.0 | 5.0 | 3.6 | 3.2 | 3.2 | 2.9 | 3.0 | 3.0 | 3.2 | 3.2 | 3.1 | 3.1 | 2.9 | 2.6 | 2.7 | 2.4 | 2.7 | 3.0 | 3.6 | 4.5 | 4.0 | 4.0 | 4.2 |
| 3.0 | 3.8 | 2.9 | 3.1 | 3.5 | 3.3 | 4.2 | 4.8 | 4.4 | 3.7 | 3.0 | 3.0 | 3.0 | 3.5 | 3.6 | 4.0 | 4.0 | 3.8 | 2.9 | 2.3 | 3.2 | 3.5 | 3.7 | 3.0 | 2.8 | 2.9 | 2.9 | 2.8 | 2.8 | 3.1 | 2.6 | 3.1 | 3.0 | 2.7 | 2.8 | 3.0 |
| 2.9 | 2.8 | 2.9 | 3.3 | 3.6 | 4.3 | 3.9 | 4.0 | 4.3 | 3.8 | 3.5 | 3.4 | 3.4 | 3.4 | 3.7 | 4.6 | 4.6 | 4.1 | 3.8 | 3.6 | 3.1 | 3.6 | 2.8 | 3.1 | 3.1 | 3.0 | 3.0 | 3.6 | 3.7 | 3.3 | 3.2 | 3.7 | 3.0 | 2.9 | 2.7 | 3.0 |
| 3.6 | 3.5 | 3.5 | 3.7 | 4.6 | 5.3 | 4.4 | 4.4 | 4.6 | 4.7 | 4.8 | 4.7 | 4.9 | 4.7 | 4.4 | 5.2 | 5.2 | 4.6 | 4.1 | 4.4 | 4.4 | 4.5 | 4.4 | 4.3 | 3.8 | 5.6 | 3.6 | 3.4 | 3.5 | 3.8 | 4.0 | 3.9 | 4.2 | 3.9 | 3.6 | 3.9 |
| 4.9 | 5.6 | 5.6 | 5.7 | 5.7 | 5.3 | 5.0 | 4.9 | 5.1 | 5.1 | 5.0 | 4.7 | 5.0 | 5.3 | 4.2 | 4.5 | 4.4 | 5.0 | 5.3 | 5.3 | 5.0 | 4.9 | 4.9 | 6.1 | 5.2 | 5.0 | 6.1 | 5.7 | 4.3 | 4.7 | 4.5 | 4.2 | 4.1 | 3.7 | 4.5 | 4.8 |
| 4.3 | 4.7 | 4.1 | 4.1 | 4.7 | 5.9 | 4.7 | 4.0 | 3.9 | 3.6 | 3.4 | 3.1 | 3.3 | 3.5 | 4.5 | 5.1 | 5.6 | 5.8 | 5.3 | 4.4 | 4.5 | 4.0 | 3.9 | 3.8 | 4.3 | 5.1 | 4.8 | 4.9 | 4.3 | 4.2 | 3.7 | 4.2 | 4.1 | 4.0 | 4.4 | 4.3 |
| 5.5 | 5.0 | 4.8 | 4.7 | 4.3 | 4.3 | 3.7 | 3.5 | 3.6 | 3.3 | 3.7 | 3.7 | 4.0 | 5.0 | 4.7 | 4.2 | 3.8 | 3.9 | 4.0 | 3.9 | 3.9 | 3.6 | 3.4 | 4.1 | 4.4 | 3.7 | 3.5 | 4.1 | 3.4 | 2.8 | 2.8 | 3.4 | 3.3 | 4.1 | 4.9 | 5.1 |
| 2.2 | 2.8 | 3.0 | 3.4 | 3.5 | 3.6 | 3.1 | 2.8 | 2.9 | 3.1 | 2.5 | 2.9 | 3.0 | 3.8 | 4.2 | 4.0 | 3.7 | 3.2 | 3.0 | 2.6 | 2.9 | 3.6 | 3.4 | 2.7 | 2.6 | 2.7 | 2.9 | 3.1 | 3.7 | 2.4 | 1.8 | 1.8 | 2.2 | 2.6 | 2.1 | 2.0 |
| 3.5 | 3.3 | 3.2 | 3.7 | 5.0 | 3.7 | 3.8 | 4.1 | 3.8 | 3.9 | 5.6 | 3.6 | 3.1 | 3.9 | 4.0 | 4.3 | 3.9 | 3.7 | 3.9 | 4.5 | 4.2 | 4.6 | 3.4 | 3.1 | 3.3 | 3.5 | 4.0 | 3.7 | 3.2 | 3.7 | 4.7 | 3.5 | 3.8 | 4.3 | 4.7 | 4.7 |
| 4.4 | 3.9 | 4.6 | 4.5 | 4.8 | 4.8 | 4.1 | 4.1 | 4.1 | 4.5 | 4.2 | 4.6 | 4.7 | 5.5 | 5.0 | 4.7 | 4.1 | 4.4 | 4.6 | 4.8 | 4.1 | 4.3 | 4.7 | 4.9 | 5.5 | 4.1 | 4.3 | 4.6 | 4.5 | 4.6 | 3.9 | 4.2 | 4.8 | 4.4 | 4.6 | 4.3 |
| 4.3 | 4.0 | 4.6 | 4.7 | 4.3 | 4.4 | 4.0 | 3.9 | 4.2 | 4.8 | 5.3 | 4.7 | 4.7 | 4.7 | 4.5 | 4.7 | 4.5 | 4.2 | 4.6 | 4.3 | 4.3 | 4.2 | 4.8 | 5.2 | 5.4 | 5.0 | 4.4 | 4.1 | 4.7 | 5.1 | 4.5 | 4.8 | 5.2 | 4.6 | 4.9 | 4.7 |
| 4.2 | 3.8 | 3.9 | 3.7 | 3.8 | 3.6 | 3.6 | 3.6 | 3.7 | 3.7 | 3.7 | 3.7 | 3.8 | 3.9 | 3.8 | 3.7 | 4.3 | 4.0 | 4.0 | 3.6 | 3.6 | 3.8 | 3.9 | 4.0 | 4.0 | 3.9 | 3.9 | 3.7 | 3.6 | 3.4 | 3.8 | 4.0 | 4.0 | 4.0 | 4.0 | 3.9 |
| 3.1 | 3.0 | 2.9 | 3.3 | 3.1 | 3.2 | 3.1 | 3.3 | 3.2 | 3.1 | 2.8 | 2.9 | 3.0 | 3.0 | 2.9 | 3.0 | 3.0 | 3.2 | 3.0 | 2.6 | 2.7 | 2.8 | 2.8 | 2.7 | 2.9 | 3.0 | 3.2 | 3.4 | 3.1 | 3.0 | 3.0 | 3.0 | 3.0 | 3.2 | 3.3 | 3.2 |
| 2.6 | 2.7 | 2.9 | 2.8 | 2.9 | 2.8 | 2.5 | 2.6 | 2.6 | 2.7 | 2.5 | 2.5 | 2.5 | 2.5 | 2.6 | 2.5 | 2.4 | 2.3 | 2.4 | 2.2 | 2.1 | 2.2 | 2.6 | 2.8 | 2.6 | 2.5 | 3.0 | 3.4 | 3.3 | 3.0 | 3.2 | 3.4 | 2.9 | 2.7 | 2.9 | 2.9 |
| 1.9 | 2.3 | 2.5 | 2.6 | 2.6 | 2.5 | 2.6 | 2.7 | 2.4 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.7 | 3.7 | 3.7 | 3.9 | 4.7 | 4.2 | 3.2 | 2.7 | 4.0 | 3.9 | 3.1 | 2.8 | 2.7 | 2.9 | 2.8 | 2.5 | 2.4 | 2.3 | 2.5 | 2.0 |
| 3.5 | 3.3 | 3.2 | 3.1 | 2.9 | 2.8 | 2.6 | 2.2 | 2.0 | 2.4 | 3.2 | 3.3 | 3.3 | 3.2 | 3.0 | 2.6 | 2.1 | 1.7 | 1.4 | 1.4 | 1.4 | 1.7 | 1.8 | 1.9 | 2.0 | 2.3 | 2.3 | 1.9 | 1.7 | 1.7 | 1.9 | 2.1 | 2.2 | 2.7 | 3.3 | 3.5 |

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



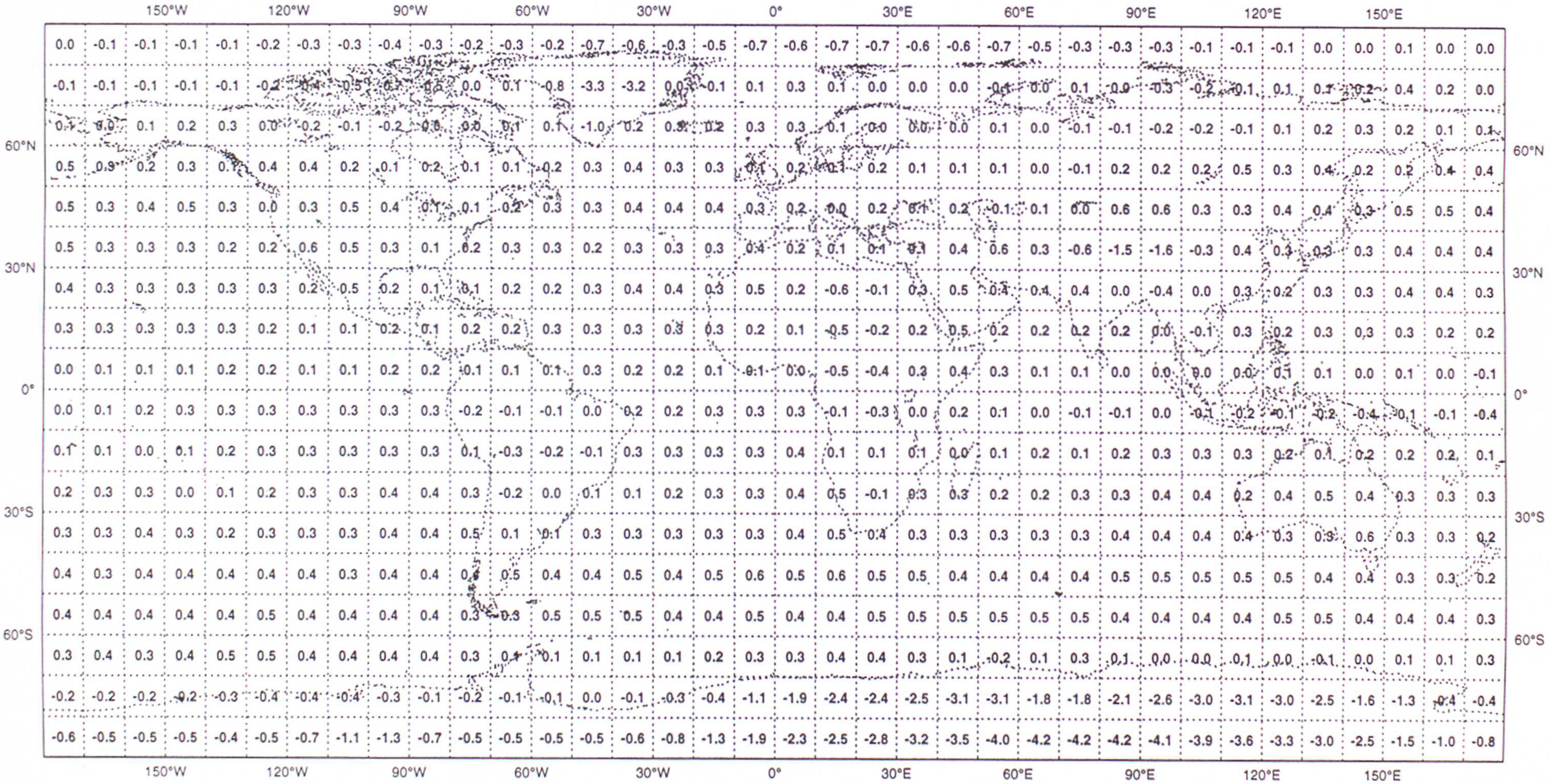
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 3.1 | 3.3 | 3.6 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.7 | 7.1 | 7.4 | 7.8 | 8.0 | 8.3 | 8.3 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.2 | 8.1 | 8.0 | 7.8 | 7.5 | 7.2 | 6.9 | 6.3 | 5.7 | 5.2 | 4.7 | 4.2 | 3.7 | 3.3 | 3.1 |
| -0.9 | -0.9 | -0.5 | 0.2 | 0.9 | 1.8 | 2.8 | 3.8 | 4.7 | 5.5 | 6.4 | 7.0 | 7.4 | 7.9 | 8.0 | 7.5 | 7.2 | 7.1 | 7.2 | 7.3 | 7.5 | 7.6 | 7.5 | 7.4 | 7.2 | 6.9 | 6.4 | 5.9 | 5.2 | 4.1 | 3.1 | 2.1 | 1.1 | 0.3 | -0.3 | -0.7 |
| -3.4 | -3.6 | -3.1 | -2.2 | -1.1 | -0.1 | 1.4 | 2.9 | 4.1 | 5.2 | 5.8 | 5.8 | 5.6 | 5.4 | 4.6 | 4.4 | 4.3 | 4.2 | 4.4 | 4.7 | 5.0 | 5.2 | 5.3 | 5.5 | 5.5 | 5.5 | 5.2 | 4.6 | 3.7 | 2.6 | 1.3 | 0.0 | -1.4 | -2.3 | -2.9 | -3.4 |
| -4.0 | -4.2 | -3.8 | -2.9 | -1.3 | -0.2 | 0.7 | 1.9 | 2.8 | 3.5 | 3.8 | 3.4 | 2.7 | 2.0 | 1.6 | 1.6 | 1.6 | 1.7 | 1.9 | 1.7 | 1.8 | 2.1 | 2.3 | 2.9 | 3.1 | 3.1 | 2.9 | 2.6 | 2.0 | 1.2 | 0.0 | -1.3 | -2.4 | -2.9 | -3.2 | -3.5 |
| -3.3 | -3.2 | -3.1 | -2.3 | -1.2 | 0.0 | 0.5 | 1.0 | 1.3 | 1.4 | 1.3 | 0.9 | 0.5 | 0.3 | 0.6 | 0.6 | 0.7 | 0.5 | 0.3 | 0.0 | 0.2 | 0.6 | 0.6 | 0.9 | 1.0 | 1.1 | 1.2 | 1.1 | 0.8 | 0.4 | -0.4 | -1.2 | -1.9 | -2.3 | -2.6 | -2.6 |
| -2.5 | -2.2 | -2.0 | -1.5 | -1.0 | -0.6 | -0.3 | -0.3 | -0.1 | -0.2 | -0.5 | -0.4 | -0.6 | -0.4 | 0.0 | -0.1 | 0.0 | -0.4 | -0.5 | -0.9 | -0.6 | -0.5 | -0.4 | -0.3 | -0.1 | 0.0 | 0.3 | 0.1 | -0.1 | 0.0 | -0.7 | -1.2 | -1.7 | -1.8 | -2.1 | -2.1 |
| -3.3 | -3.0 | -2.7 | -2.2 | -1.9 | -1.8 | -1.5 | -1.9 | -1.7 | -2.0 | -2.3 | -1.9 | -2.1 | -1.5 | -1.1 | -1.1 | -1.1 | -1.5 | -1.7 | -2.0 | -1.8 | -2.0 | -1.7 | -1.7 | -1.6 | -2.1 | -2.0 | -2.2 | -2.4 | -2.1 | -2.6 | -3.0 | -3.3 | -3.2 | -3.3 | -3.3 |
| -3.9 | -4.1 | -4.1 | -3.6 | -3.2 | -3.0 | -2.4 | -2.9 | -2.9 | -3.3 | -3.6 | -3.2 | -3.3 | -2.9 | -2.5 | -2.2 | -2.3 | -2.3 | -2.9 | -3.0 | -2.9 | -3.1 | -2.9 | -3.0 | -2.9 | -3.3 | -3.3 | -3.4 | -3.5 | -3.5 | -3.7 | -3.8 | -3.9 | -3.8 | -3.7 | -4.4 |
| -3.5 | -4.3 | -4.2 | -4.0 | -3.6 | -3.3 | -3.1 | -3.4 | -3.4 | -3.7 | -3.8 | -3.6 | -3.8 | -3.4 | -3.1 | -2.7 | -3.0 | -2.8 | -3.4 | -3.1 | -3.3 | -3.4 | -3.4 | -3.3 | -3.1 | -3.4 | -3.4 | -3.4 | -3.4 | -2.5 | -3.4 | -3.5 | -3.5 | -3.7 | -3.5 | -4.5 |
| -3.4 | -4.3 | -4.2 | -4.0 | -3.6 | -3.5 | -3.5 | -3.6 | -3.8 | -3.8 | -3.7 | -3.5 | -3.6 | -3.5 | -3.1 | -2.6 | -3.3 | -3.1 | -3.5 | -3.0 | -3.2 | -3.4 | -3.4 | -3.2 | -3.3 | -3.2 | -3.5 | -3.4 | -3.4 | -3.3 | -3.6 | -3.6 | -3.9 | -4.2 | -3.8 | -4.6 |
| -4.6 | -4.8 | -4.1 | -3.6 | -3.2 | -3.0 | -3.0 | -2.8 | -3.5 | -3.9 | -4.0 | -4.2 | -4.0 | -3.5 | -3.5 | -2.8 | -3.4 | -3.3 | -4.0 | -3.6 | -3.9 | -3.9 | -3.8 | -3.6 | -3.8 | -3.4 | -4.0 | -4.0 | -4.0 | -4.3 | -4.1 | -4.3 | -4.6 | -4.5 | -4.5 | -5.1 |
| -4.3 | -4.2 | -4.1 | -3.8 | -3.3 | -2.9 | -2.9 | -2.5 | -3.2 | -3.8 | -4.2 | -4.5 | -4.2 | -4.0 | -3.8 | -3.3 | -3.6 | -3.7 | -4.1 | -3.9 | -3.9 | -4.2 | -4.2 | -3.9 | -3.8 | -3.3 | -3.7 | -3.8 | -3.8 | -4.3 | -4.0 | -4.4 | -4.3 | -4.2 | -4.3 | -4.7 |
| -4.0 | -3.8 | -4.1 | -4.0 | -3.8 | -3.5 | -3.5 | -3.2 | -3.5 | -3.7 | -3.7 | -4.1 | -3.9 | -4.1 | -4.2 | -3.9 | -3.8 | -4.0 | -3.7 | -4.1 | -4.0 | -4.0 | -4.1 | -4.0 | -4.0 | -3.5 | -3.7 | -3.7 | -3.6 | -4.0 | -4.0 | -4.0 | -4.1 | -3.9 | -4.0 | -3.8 |
| -5.0 | -4.6 | -4.7 | -4.8 | -4.6 | -4.5 | -4.6 | -4.6 | -4.6 | -4.6 | -4.6 | -4.7 | -4.8 | -5.0 | -5.1 | -5.0 | -4.9 | -5.2 | -4.8 | -5.2 | -5.2 | -5.2 | -5.1 | -5.0 | -4.9 | -4.8 | -4.9 | -5.0 | -5.0 | -5.0 | -5.1 | -5.1 | -5.0 | -4.9 | -4.8 | -4.5 |
| -6.8 | -6.7 | -6.6 | -6.7 | -6.6 | -6.5 | -6.5 | -6.5 | -6.6 | -6.7 | -6.7 | -6.6 | -6.7 | -6.8 | -6.8 | -6.7 | -6.5 | -6.7 | -6.9 | -7.1 | -7.3 | -7.3 | -7.3 | -7.2 | -7.1 | -7.2 | -7.3 | -7.4 | -7.4 | -7.4 | -7.4 | -7.3 | -7.2 | -7.1 | -6.9 | -6.7 |
| -8.5 | -8.6 | -8.5 | -8.5 | -8.4 | -8.3 | -8.3 | -8.4 | -8.5 | -8.4 | -8.2 | -7.9 | -7.7 | -7.6 | -7.4 | -7.4 | -7.6 | -7.9 | -8.2 | -8.3 | -8.3 | -8.3 | -8.3 | -8.3 | -8.3 | -8.2 | -8.2 | -8.3 | -8.3 | -8.5 | -8.6 | -8.6 | -8.6 | -8.5 | -8.5 | -8.4 |
| -9.3 | -9.3 | -9.2 | -9.0 | -8.9 | -8.9 | -8.9 | -8.9 | -8.9 | -8.7 | -8.6 | -8.5 | -8.3 | -8.3 | -8.3 | -8.4 | -8.5 | -8.4 | -8.3 | -8.2 | -8.1 | -8.0 | -7.9 | -7.9 | -8.2 | -8.1 | -7.7 | -7.6 | -7.7 | -8.0 | -8.1 | -8.3 | -8.6 | -8.8 | -9.0 | -9.2 |
| -9.3 | -9.4 | -9.3 | -9.4 | -9.3 | -9.2 | -9.1 | -9.1 | -9.0 | -9.1 | -9.2 | -9.2 | -9.2 | -9.3 | -9.2 | -9.2 | -9.1 | -9.1 | -9.0 | -8.8 | -8.7 | -8.4 | -8.2 | -8.1 | -8.0 | -8.0 | -8.0 | -8.0 | -8.2 | -8.4 | -8.6 | -8.8 | -9.0 | -9.1 | -9.2 | -9.3 |

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



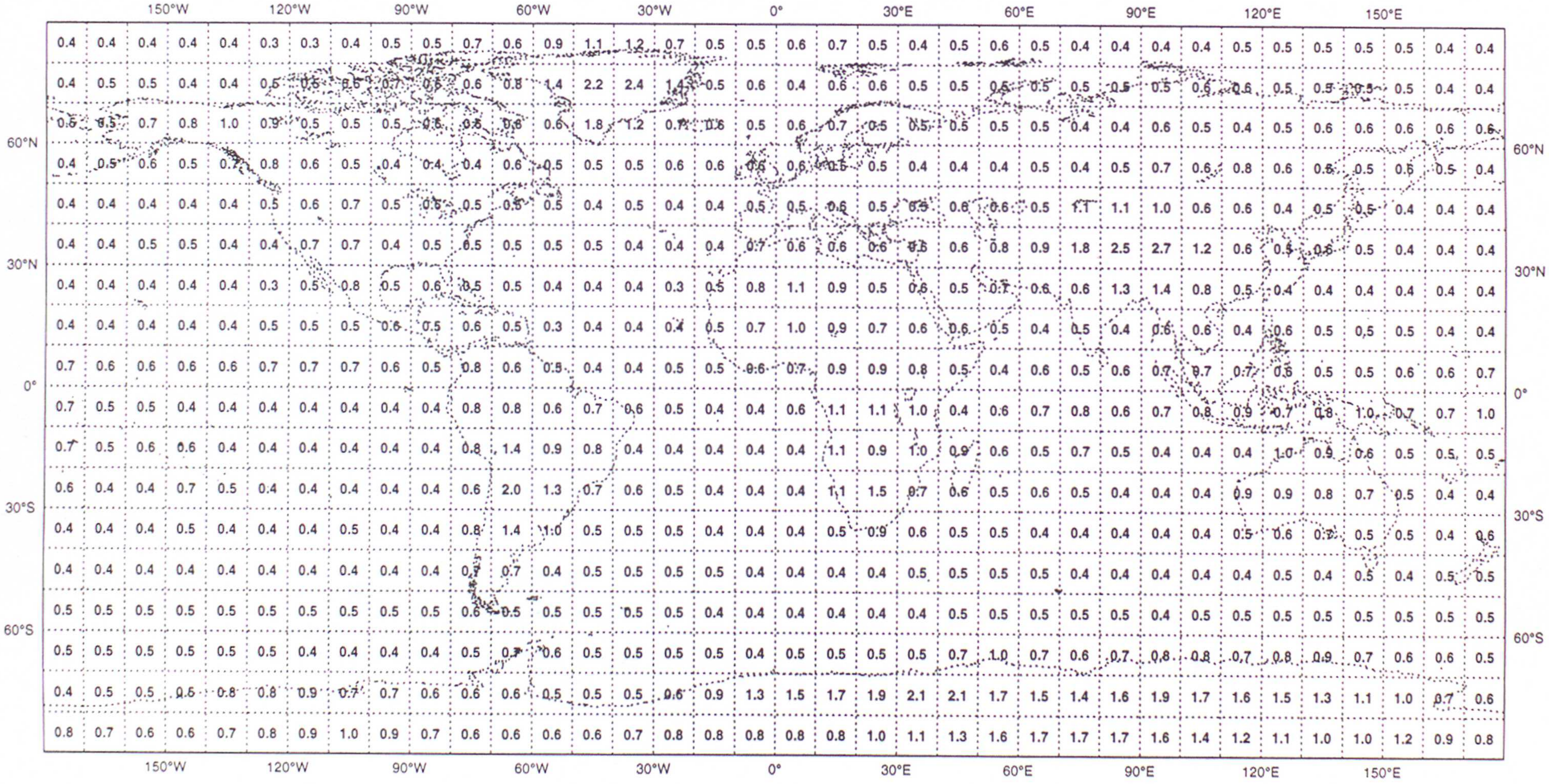
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.9 | 2.9 | 2.8 | 2.7 | 2.7 | 2.6 | 2.5 | 2.4 | 2.3 | 2.2 | 2.0 | 1.9 | 1.7 | 1.7 | 1.6 | 1.7 | 1.8 | 1.9 | 2.0 | 2.1 | 2.2 | 2.3 | 2.4 | 2.4 | 2.4 | 2.4 | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 2.9 | 3.0 | 3.0 | 3.0 |
| 2.4 | 2.4 | 2.4 | 2.4 | 2.6 | 2.8 | 3.0 | 3.0 | 2.9 | 2.8 | 2.4 | 2.0 | 1.7 | 1.6 | 1.8 | 2.2 | 2.6 | 3.0 | 3.3 | 3.4 | 3.3 | 3.3 | 3.2 | 3.8 | 2.7 | 2.5 | 2.5 | 2.7 | 2.9 | 3.1 | 3.3 | 3.3 | 3.3 | 3.1 | 2.8 | 2.5 |
| 1.9 | 2.0 | 2.1 | 2.2 | 2.4 | 2.6 | 3.2 | 3.7 | 3.9 | 3.9 | 3.4 | 2.8 | 2.3 | 2.6 | 3.2 | 3.7 | 4.2 | 4.7 | 4.9 | 4.7 | 4.3 | 3.8 | 3.0 | 2.4 | 1.9 | 1.9 | 2.1 | 2.4 | 2.7 | 3.0 | 3.1 | 3.3 | 3.0 | 2.4 | 2.1 | 1.9 |
| 1.3 | 1.9 | 1.5 | 1.6 | 1.9 | 2.0 | 2.5 | 3.1 | 3.7 | 3.9 | 3.4 | 2.9 | 2.4 | 2.5 | 2.8 | 3.2 | 3.7 | 4.1 | 4.4 | 2.8 | 3.4 | 2.7 | 2.0 | 1.7 | 1.6 | 1.7 | 1.9 | 2.0 | 2.0 | 2.0 | 1.9 | 1.8 | 1.7 | 1.6 | 1.5 | 1.4 |
| 1.2 | 1.2 | 1.3 | 1.5 | 1.7 | 1.9 | 2.0 | 2.2 | 2.4 | 2.6 | 2.4 | 2.0 | 1.8 | 1.9 | 2.0 | 2.1 | 2.3 | 2.4 | 2.4 | 2.1 | 1.8 | 1.7 | 1.4 | 1.6 | 1.5 | 1.5 | 1.5 | 1.3 | 1.2 | 1.1 | 1.0 | 1.2 | 1.3 | 1.3 | 1.4 | 1.3 |
| 1.5 | 1.5 | 1.6 | 1.8 | 1.9 | 1.9 | 2.0 | 1.9 | 1.8 | 1.7 | 1.7 | 1.7 | 1.8 | 1.8 | 1.9 | 1.8 | 1.8 | 1.6 | 1.6 | 1.5 | 1.6 | 1.5 | 1.4 | 1.5 | 1.4 | 1.5 | 1.5 | 1.5 | 1.4 | 1.2 | 1.2 | 1.5 | 1.8 | 1.5 | 1.7 | 1.7 |
| 2.2 | 2.2 | 2.1 | 2.2 | 2.2 | 2.0 | 2.1 | 1.9 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.9 | 1.9 | 1.9 | 2.1 | 2.0 | 1.9 | 2.0 | 2.0 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.2 | 2.1 | 2.2 | 2.3 |
| 2.4 | 2.3 | 2.3 | 2.4 | 2.3 | 2.2 | 2.1 | 2.1 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.1 | 2.1 | 2.2 | 2.2 | 2.3 | 2.4 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.5 | 2.2 |
| 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.4 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.3 | 2.3 | 2.4 | 2.5 | 2.1 |
| 2.5 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.3 | 2.2 | 2.2 | 2.2 | 2.4 | 2.1 | 2.3 | 2.2 | 2.2 | 2.3 | 2.3 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.4 | 2.0 |
| 2.3 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.0 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.2 | 2.3 | 2.1 | 2.4 | 2.1 | 2.2 | 2.2 | 2.2 | 2.2 | 2.3 | 2.2 | 2.2 | 2.3 | 2.2 | 2.3 | 2.3 | 2.2 | 2.4 | 2.4 | 2.1 |
| 2.1 | 2.0 | 2.0 | 2.0 | 1.9 | 2.0 | 1.8 | 2.0 | 2.0 | 2.0 | 2.2 | 2.1 | 2.2 | 2.1 | 1.9 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.0 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.0 | 2.1 | 2.1 | 2.1 | 2.1 | 2.1 | 2.2 | 2.1 | 2.1 |
| 1.5 | 1.7 | 1.8 | 1.8 | 1.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.7 | 1.7 | 1.7 | 1.7 | 1.6 | 1.6 | 1.9 | 1.8 | 1.6 | 1.7 | 1.8 | 1.7 | 1.7 | 1.8 | 1.7 | 1.8 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.9 | 1.8 | 1.7 | 1.7 | 1.8 | 1.7 |
| 1.3 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.4 | 1.8 | 1.2 | 1.3 | 1.3 | 1.3 | 1.4 | 1.5 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 |
| 1.1 | 1.3 | 1.2 | 1.3 | 1.4 | 1.2 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.1 | 1.2 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 | 1.0 | 1.1 | 1.3 | 1.3 | 1.3 | 1.2 |
| 0.8 | 0.8 | 0.9 | 1.0 | 1.0 | 1.1 | 1.1 | 0.9 | 0.9 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 |
| 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 |
| 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 |

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.2 | -0.3 | -0.3 | -0.4 | -0.3 | -0.2 | -0.3 | -0.2 | -0.7 | -0.6 | -0.3 | -0.5 | -0.7 | -0.6 | -0.7 | -0.7 | -0.6 | -0.6 | -0.7 | -0.5 | -0.3 | -0.3 | -0.3 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.2 | -0.4 | -0.5 | -0.7 | -0.5 | 0.0 | 0.1 | -0.8 | -3.3 | -3.2 | 0.0 | -0.1 | 0.1 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.1 | 0.0 | -0.3 | -0.2 | -0.1 | 0.1 | 0.1 | -0.2 | 0.4 | 0.2 | 0.0 |
| 0.1 | 0.0 | 0.1 | 0.2 | 0.3 | 0.0 | -0.2 | -0.1 | -0.2 | 0.0 | 0.0 | 0.1 | 0.1 | -1.0 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -0.1 | -0.1 | -0.2 | -0.2 | -0.1 | 0.1 | 0.2 | 0.3 | 0.2 | 0.1 | 0.1 |
| 0.5 | 0.3 | 0.2 | 0.3 | 0.1 | 0.4 | 0.4 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | -0.2 | 0.3 | 0.4 | 0.3 | 0.3 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | 0.2 | 0.2 | 0.2 | 0.5 | 0.3 | 0.4 | 0.2 | 0.2 | 0.4 | 0.4 |
| 0.5 | 0.3 | 0.4 | 0.5 | 0.3 | 0.0 | 0.3 | 0.5 | 0.4 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.2 | 0.0 | 0.2 | 0.1 | 0.2 | -0.1 | 0.1 | 0.0 | 0.6 | 0.6 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | 0.5 | 0.5 | 0.4 |
| 0.5 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.6 | 0.5 | 0.3 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 | 0.4 | 0.6 | 0.3 | -0.6 | -1.5 | -1.6 | -0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.5 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.4 | 0.3 | 0.5 | 0.2 | -0.6 | -0.1 | 0.3 | 0.5 | 0.4 | 0.4 | 0.4 | 0.0 | -0.4 | 0.0 | 0.3 | -0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | -0.5 | -0.2 | 0.2 | 0.5 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0 | -0.1 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 |
| 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | -0.1 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | -0.5 | -0.4 | 0.3 | 0.4 | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.1 | 0.0 | -0.1 |
| 0.0 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | -0.2 | -0.1 | -0.1 | 0.0 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | -0.1 | -0.3 | 0.0 | 0.2 | 0.1 | 0.0 | -0.1 | -0.1 | 0.0 | -0.1 | -0.2 | -0.1 | -0.2 | -0.4 | 0.1 | -0.1 | -0.4 |
| 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.1 | -0.3 | -0.2 | -0.1 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 |
| 0.2 | 0.3 | 0.3 | 0.0 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | -0.2 | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | -0.1 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.2 | 0.4 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 |
| 0.3 | 0.3 | 0.4 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.1 | 0.1 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.6 | 0.3 | 0.3 | 0.2 |
| 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.2 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 |
| 0.3 | 0.4 | 0.3 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | 0.1 | -0.2 | 0.1 | 0.3 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | -0.1 | 0.0 | 0.1 | 0.1 | 0.3 |
| -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.4 | -0.4 | -0.4 | -0.3 | -0.1 | -0.2 | -0.1 | -0.1 | 0.0 | -0.1 | -0.3 | -0.4 | -1.1 | -1.9 | -2.4 | -2.4 | -2.5 | -3.1 | -3.1 | -1.8 | -1.8 | -2.1 | -2.6 | -3.0 | -3.1 | -3.0 | -2.5 | -1.6 | -1.3 | -0.4 | -0.4 |
| -0.6 | -0.5 | -0.5 | -0.5 | -0.4 | -0.5 | -0.7 | -1.1 | -1.3 | -0.7 | -0.5 | -0.5 | -0.5 | -0.5 | -0.6 | -0.8 | -1.3 | -1.9 | -2.3 | -2.5 | -2.8 | -3.2 | -3.5 | -4.0 | -4.2 | -4.2 | -4.2 | -4.1 | -3.9 | -3.6 | -3.3 | -3.0 | -2.5 | -1.5 | -1.0 | -0.8 |

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.5 | 0.5 | 0.7 | 0.6 | 0.9 | 1.1 | 1.2 | 0.7 | 0.5 | 0.5 | 0.6 | 0.7 | 0.5 | 0.4 | 0.5 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.5 | 0.6 | 0.8 | 1.4 | 2.2 | 2.4 | 1.4 | 0.5 | 0.6 | 0.4 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| 0.5 | 0.5 | 0.7 | 0.8 | 1.0 | 0.9 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.6 | 1.8 | 1.2 | 0.7 | 0.6 | 0.5 | 0.6 | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.6 | 0.5 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 0.4 | 0.5 | 0.6 | 0.5 | 0.7 | 0.8 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.7 | 0.6 | 0.8 | 0.6 | 0.6 | 0.5 | 0.6 | 0.5 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.7 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 1.1 | 1.1 | 1.0 | 0.6 | 0.6 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.7 | 0.7 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.6 | 0.8 | 0.9 | 1.8 | 2.5 | 2.7 | 1.2 | 0.6 | 0.5 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.5 | 0.8 | 0.5 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 | 0.5 | 0.8 | 1.1 | 0.9 | 0.5 | 0.6 | 0.5 | 0.7 | 0.6 | 0.6 | 1.3 | 1.4 | 0.8 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 1.0 | 0.9 | 0.7 | 0.6 | 0.6 | 0.5 | 0.4 | 0.5 | 0.4 | 0.6 | 0.6 | 0.4 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.5 | 0.8 | 0.6 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.9 | 0.9 | 0.8 | 0.5 | 0.4 | 0.6 | 0.5 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.5 | 0.5 | 0.6 | 0.6 | 0.7 |
| 0.7 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.8 | 0.8 | 0.6 | 0.7 | 0.6 | 0.5 | 0.4 | 0.4 | 0.6 | 1.1 | 1.1 | 1.0 | 0.4 | 0.6 | 0.7 | 0.8 | 0.6 | 0.7 | 0.8 | 0.9 | 0.7 | 0.8 | 1.0 | 0.7 | 0.7 | 1.0 |
| 0.7 | 0.5 | 0.6 | 0.6 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.8 | 1.4 | 0.9 | 0.8 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 1.1 | 0.9 | 1.0 | 0.9 | 0.6 | 0.5 | 0.7 | 0.5 | 0.4 | 0.4 | 0.4 | 1.0 | 0.9 | 0.6 | 0.5 | 0.5 | 0.5 |
| 0.6 | 0.4 | 0.4 | 0.7 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 2.0 | 1.3 | 0.7 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 1.1 | 1.5 | 0.7 | 0.6 | 0.5 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.9 | 0.9 | 0.8 | 0.7 | 0.5 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.8 | 1.4 | 1.0 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.9 | 0.6 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.7 | 0.5 | 0.5 | 0.4 | 0.6 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.7 | 0.7 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.4 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | 1.0 | 0.7 | 0.6 | 0.7 | 0.8 | 0.8 | 0.7 | 0.8 | 0.9 | 0.7 | 0.6 | 0.6 | 0.5 |
| 0.4 | 0.5 | 0.5 | 0.6 | 0.8 | 0.8 | 0.9 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.9 | 1.3 | 1.5 | 1.7 | 1.9 | 2.1 | 2.1 | 1.7 | 1.5 | 1.4 | 1.6 | 1.9 | 1.7 | 1.6 | 1.5 | 1.3 | 1.1 | 1.0 | 0.7 | 0.6 |
| 0.8 | 0.7 | 0.6 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 0.9 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 1.0 | 1.1 | 1.3 | 1.6 | 1.7 | 1.7 | 1.7 | 1.6 | 1.4 | 1.2 | 1.1 | 1.0 | 1.0 | 1.2 | 0.9 | 0.8 |

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

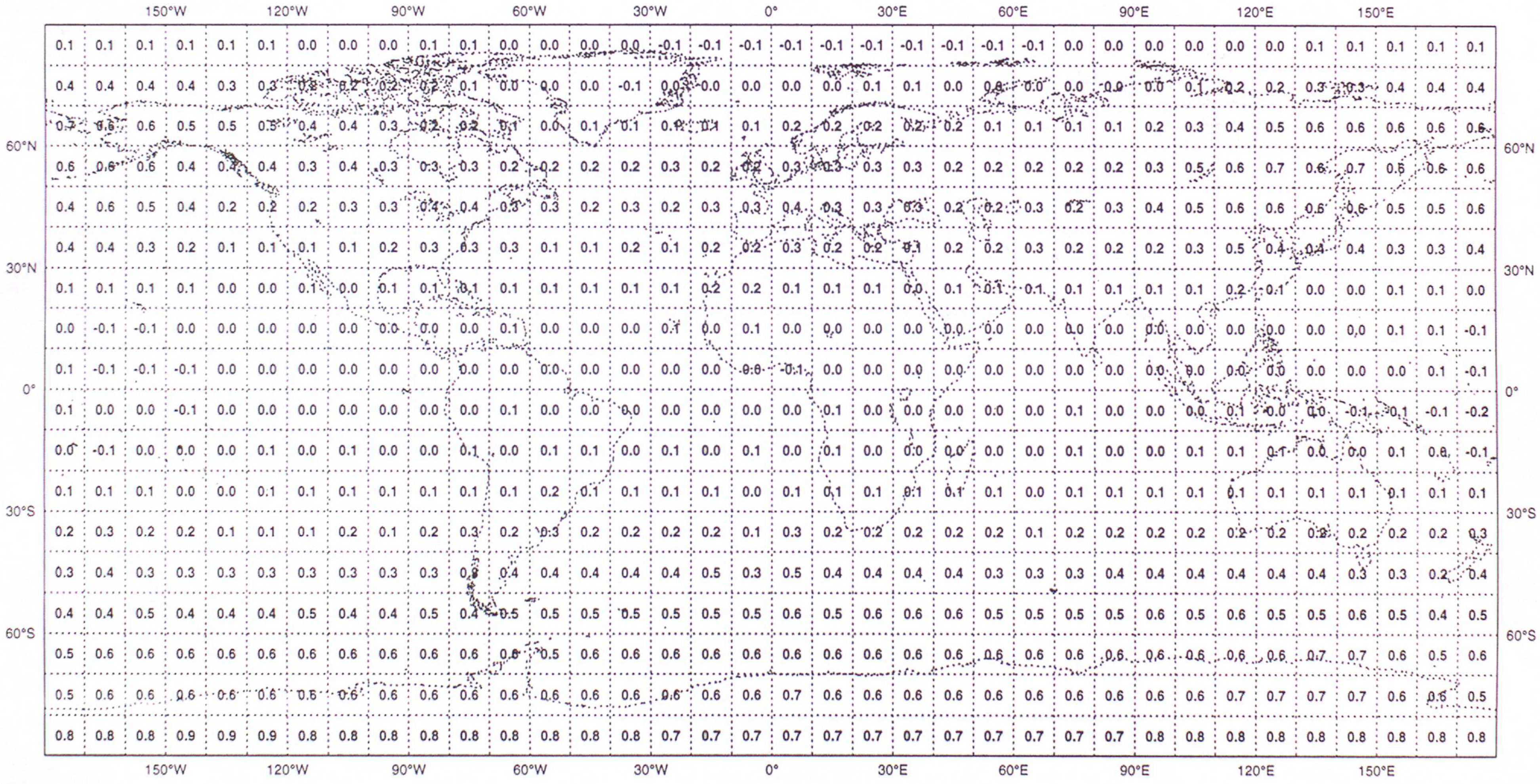

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.0 0.0 0.1 0.1 0.0 0.0 0.0 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.1 0.1 0.1
0.4 0.4 0.4 0.4 0.3 0.3 0.2 0.2 0.2 0.2 0.1 0.0 0.0 0.0 -0.1 0.0 -0.0 0.0 0.0 0.0 0.1 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.2 0.2 0.3 0.3 0.4 0.4 0.4
0.7 0.6 0.6 0.5 0.5 0.5 0.4 0.4 0.3 0.2 0.2 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.2 0.3 0.4 0.5 0.6 0.6 0.6 0.6 0.6
0.6 0.6 0.6 0.4 0.4 0.4 0.3 0.4 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.3 0.5 0.6 0.7 0.6 0.7 0.6 0.6 0.6
0.4 0.6 0.5 0.4 0.2 0.2 0.2 0.3 0.3 0.4 0.4 0.3 0.3 0.2 0.3 0.2 0.3 0.3 0.4 0.3 0.3 0.3 0.2 0.2 0.3 0.2 0.3 0.4 0.5 0.6 0.6 0.6 0.6 0.5 0.5 0.6
0.4 0.4 0.3 0.2 0.1 0.1 0.1 0.1 0.2 0.3 0.3 0.3 0.1 0.1 0.2 0.1 0.2 0.2 0.3 0.2 0.2 0.1 0.2 0.2 0.3 0.2 0.2 0.2 0.3 0.5 0.4 0.4 0.4 0.3 0.3 0.4
0.1 0.1 0.1 0.1 0.0 0.0 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.2 0.1 0.1 0.1 0.0 0.1 0.1 -0.1 0.1 0.1 0.1 0.1 0.2 -0.1 0.0 0.0 0.1 0.1 0.0
0.0 -0.1 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.1 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 -0.1
0.1 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 -0.1
0.1 0.0 0.0 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.1 0.0 0.0 -0.1 -0.1 -0.1 -0.2
0.0 -0.1 0.0 0.0 0.0 0.1 0.0 0.1 0.0 0.0 0.1 0.0 0.1 0.1 0.0 0.1 0.0 0.1 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.1 0.1 0.1 0.0 0.0 0.1 0.0 -0.1
0.1 0.1 0.1 0.0 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.1 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1
0.2 0.3 0.2 0.2 0.1 0.1 0.1 0.2 0.1 0.2 0.3 0.2 0.3 0.2 0.2 0.2 0.2 0.1 0.3 0.2 0.2 0.2 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3
0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.5 0.3 0.5 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.2 0.4
0.4 0.4 0.5 0.4 0.4 0.4 0.5 0.4 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.6 0.6 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.5 0.5 0.6 0.5 0.4 0.5
0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.7 0.7 0.6 0.5 0.6
0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.7 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.7 0.7 0.7 0.7 0.6 0.6 0.5
0.8 0.8 0.8 0.9 0.9 0.9 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

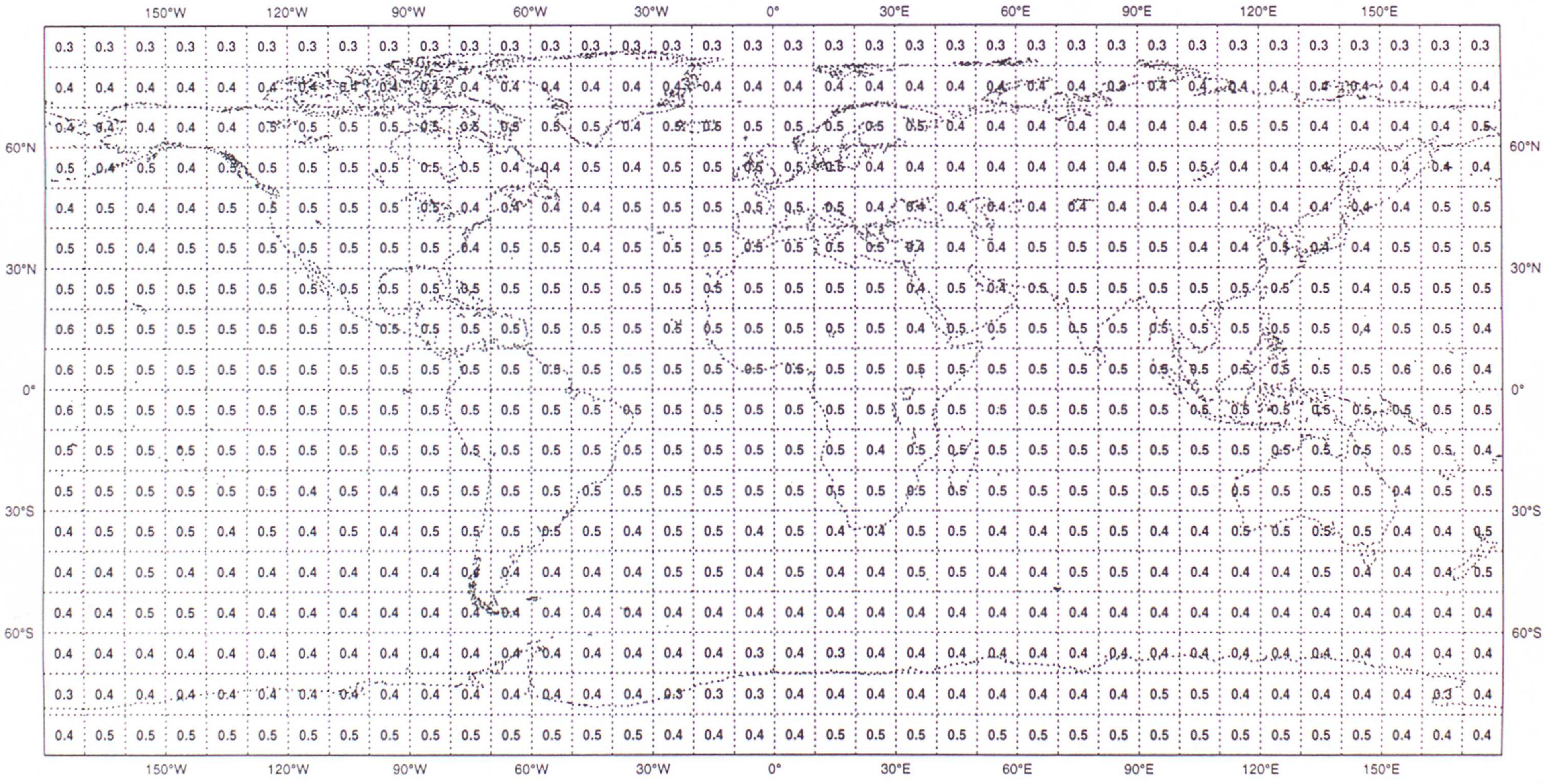

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.5
0.5 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.4 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5
0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.4 0.4 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5
0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4
0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.4
0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4
0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5
0.4 0.5 0.5 0.5 0.4 0.5 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.5 0.4 0.4 0.5 0.5 0.4 0.4 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.5
0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.5 0.4 0.4 0.5 0.5 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.5
0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.3 0.4
0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

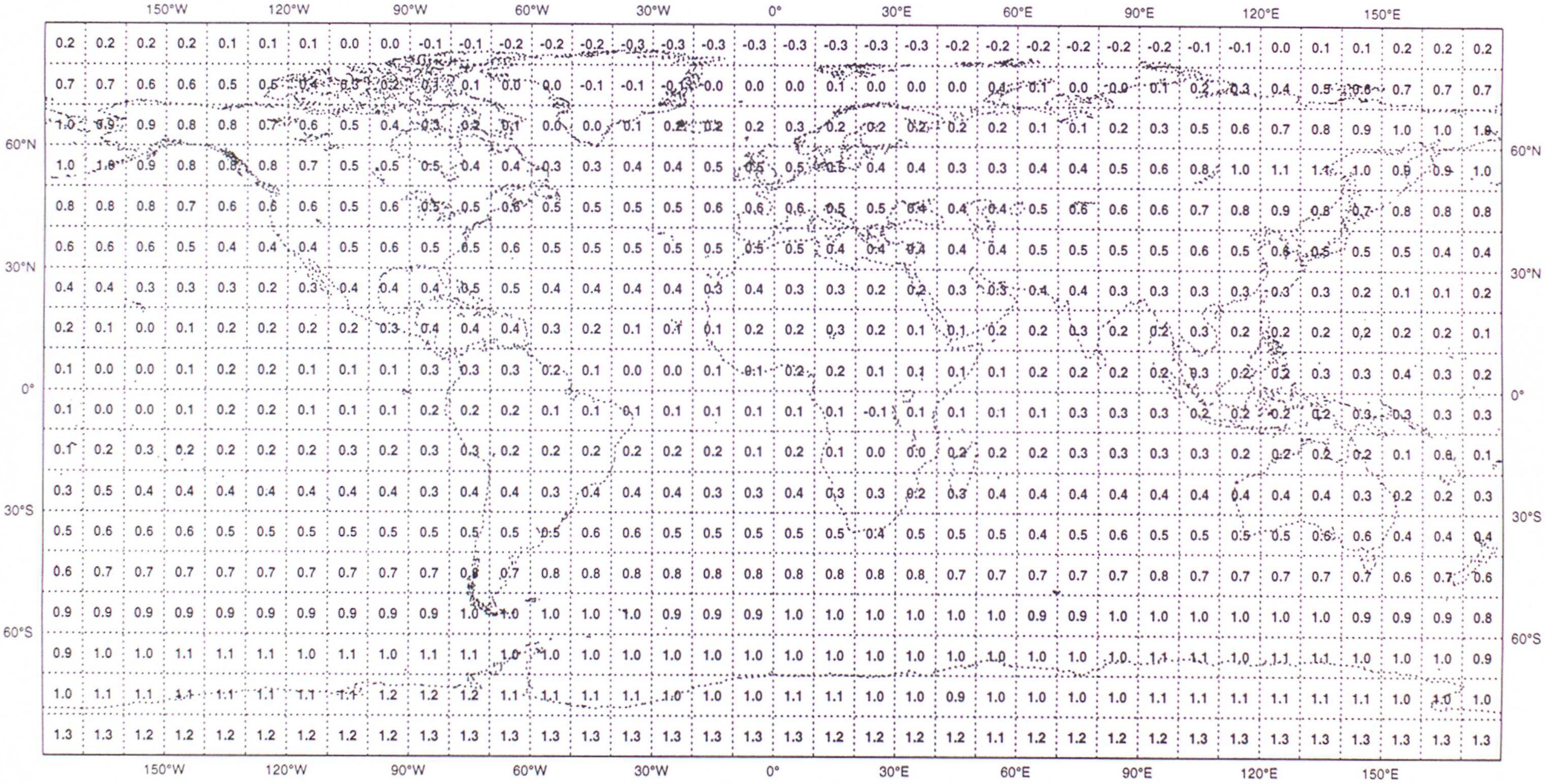

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.0 0.0 -0.1 -0.1 -0.2 -0.2 -0.2 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.1 -0.1 0.0 0.1 0.1 0.2 0.2 0.2
0.7 0.7 0.6 0.6 0.5 0.5 0.4 0.3 0.2 0.1 0.1 0.0 0.0 -0.1 -0.1 -0.1 -0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.4 0.1 0.0 0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.7 0.7
1.0 0.9 0.9 0.8 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0 0.0 0.1 0.2 0.2 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.2 0.3 0.5 0.6 0.7 0.8 0.9 1.0 1.0 1.0
1.0 1.0 0.9 0.8 0.8 0.8 0.7 0.5 0.5 0.5 0.4 0.4 0.3 0.3 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.4 0.3 0.3 0.4 0.4 0.5 0.6 0.8 1.0 1.1 1.1 1.0 0.9 0.9 1.0
0.8 0.8 0.8 0.7 0.6 0.6 0.6 0.5 0.6 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.5 0.5 0.4 0.4 0.4 0.5 0.6 0.6 0.6 0.7 0.8 0.9 0.8 0.7 0.8 0.8 0.8
0.6 0.6 0.6 0.5 0.4 0.4 0.4 0.5 0.6 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.5 0.5 0.5 0.4 0.4
0.4 0.4 0.3 0.3 0.3 0.2 0.3 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.3 0.2 0.2 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.1 0.1 0.2
0.2 0.1 0.0 0.1 0.2 0.2 0.2 0.2 0.3 0.4 0.4 0.4 0.3 0.2 0.1 0.1 0.1 0.2 0.2 0.3 0.2 0.1 0.1 0.2 0.2 0.3 0.2 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.1
0.1 0.0 0.0 0.1 0.2 0.2 0.1 0.1 0.1 0.3 0.3 0.3 0.2 0.1 0.0 0.0 0.1 0.1 0.2 0.2 0.1 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.3 0.3 0.4 0.3 0.2
0.1 0.0 0.0 0.1 0.2 0.2 0.1 0.1 0.1 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 -0.1 0.1 0.1 0.1 0.1 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3
0.1 0.2 0.3 0.2 0.2 0.2 0.2 0.3 0.2 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.2 0.1 0.0 0.0 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.1 0.0 0.1
0.3 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.3 0.4 0.4 0.4 0.3 0.3 0.4 0.3 0.3 0.2 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.2 0.2 0.3
0.5 0.6 0.6 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.4 0.5 0.6 0.5 0.5 0.5 0.5 0.6 0.6 0.4 0.4 0.4
0.6 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.7 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.8 0.7 0.7 0.7 0.7 0.7 0.8 0.7 0.7 0.7 0.7 0.7 0.6 0.7 0.6
0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 1.0 1.0 1.0 1.0 1.0 0.9 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.9 0.9 0.9 0.8
0.9 1.0 1.0 1.1 1.1 1.1 1.0 1.1 1.0 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.0 1.1 1.1 1.0 1.0 1.0 0.9
1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.2 1.2 1.2 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.1 1.1 1.0 1.0 0.9 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0
1.3 1.3 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.2 1.2 1.2 1.2 1.1 1.2 1.2 1.2 1.2 1.3 1.3 1.3 1.3 1.3 1.3 1.3 1.3

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

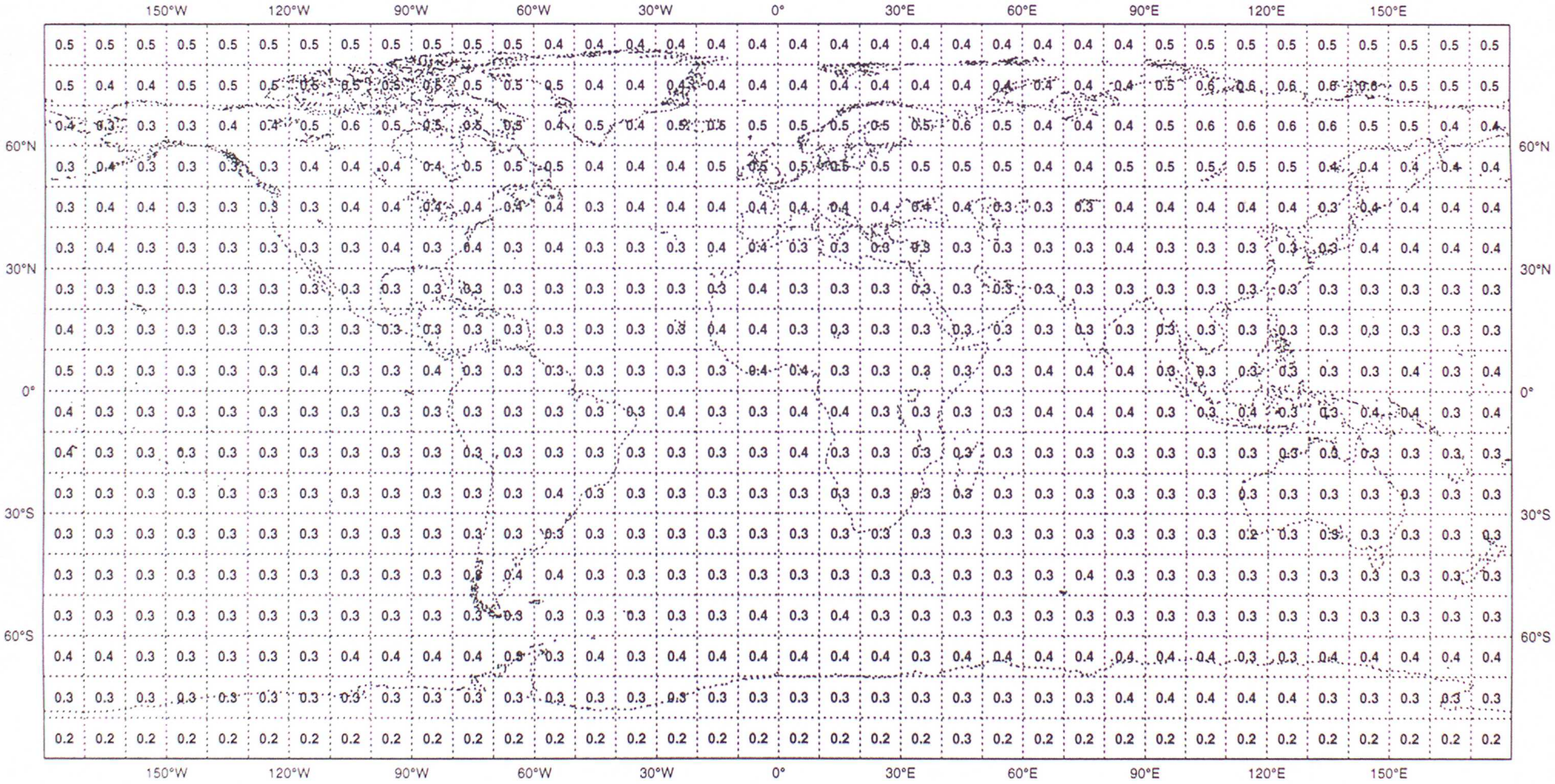
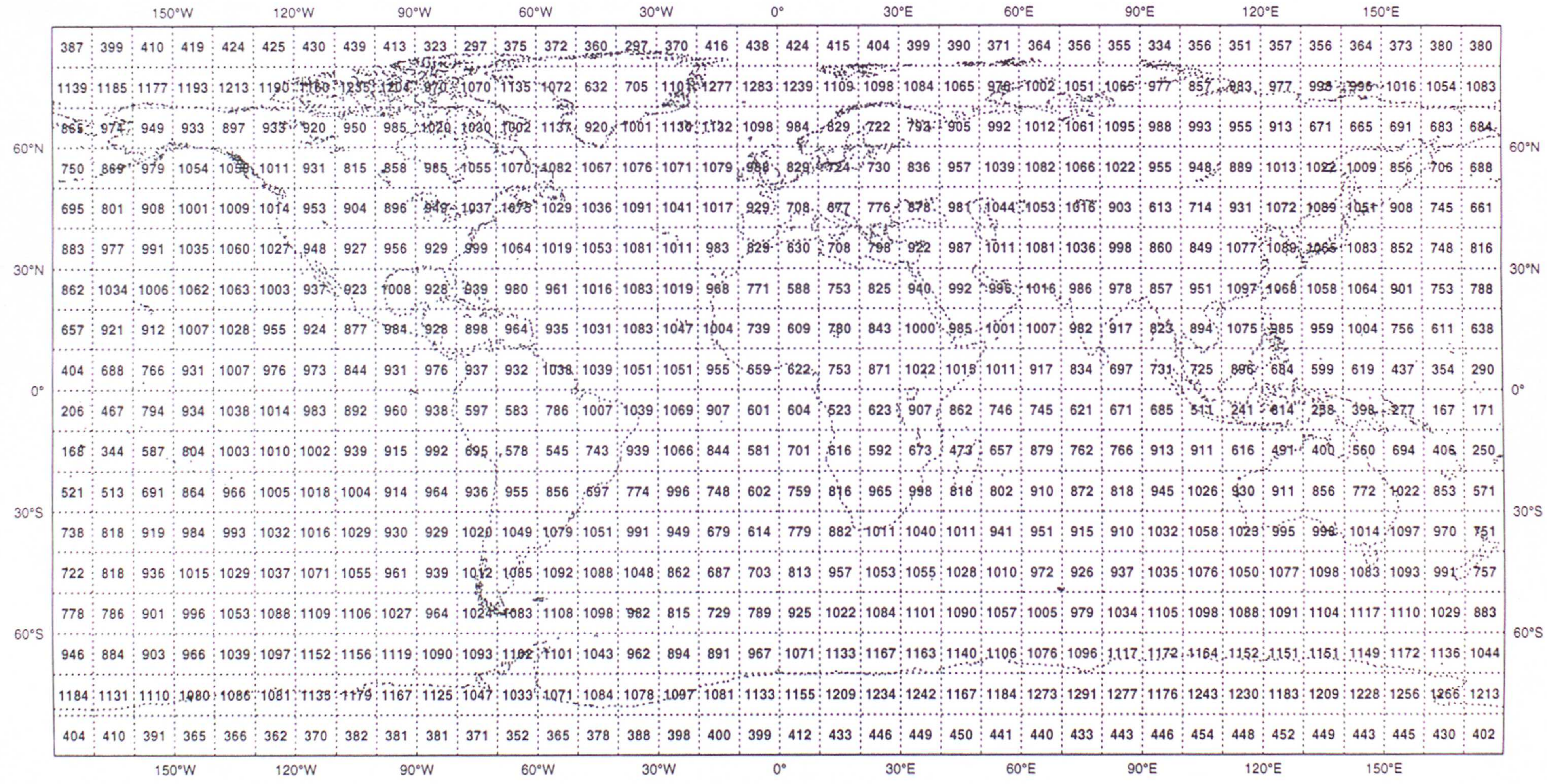
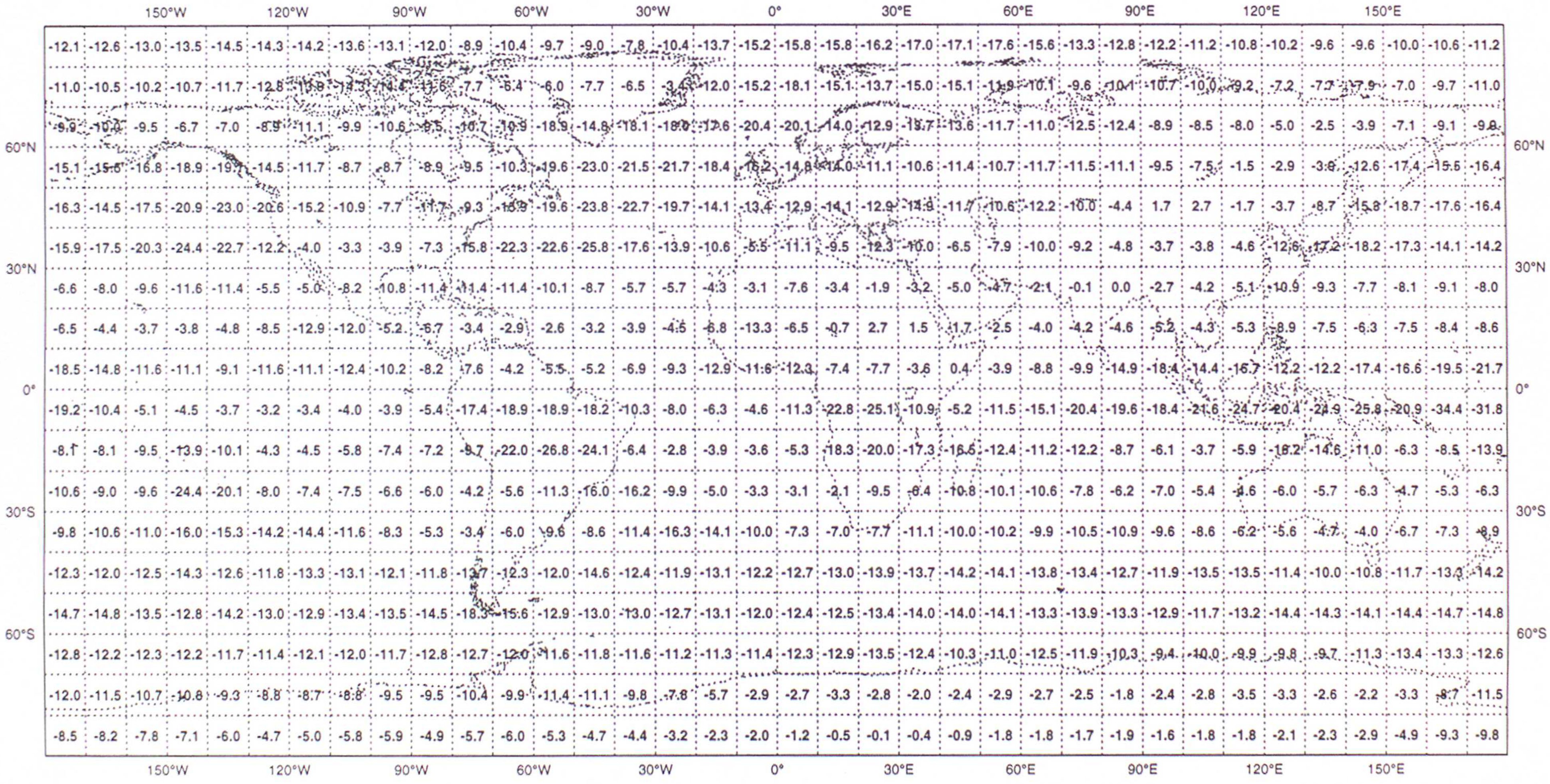

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5
0.4 0.3 0.3 0.3 0.4 0.4 0.5 0.6 0.5 0.5 0.5 0.5 0.4 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.4 0.4 0.4 0.5 0.6 0.6 0.6 0.6 0.5 0.5 0.4 0.4
0.3 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4
0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.4
0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.4 0.3 0.4 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.5 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.4
0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.3 0.3 0.4 0.3 0.3 0.4 0.4 0.3 0.4
0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.5 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.4 0.4 0.4
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3
0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2

Figure 40. ATOVS mean daily count. JANUARY 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 564865



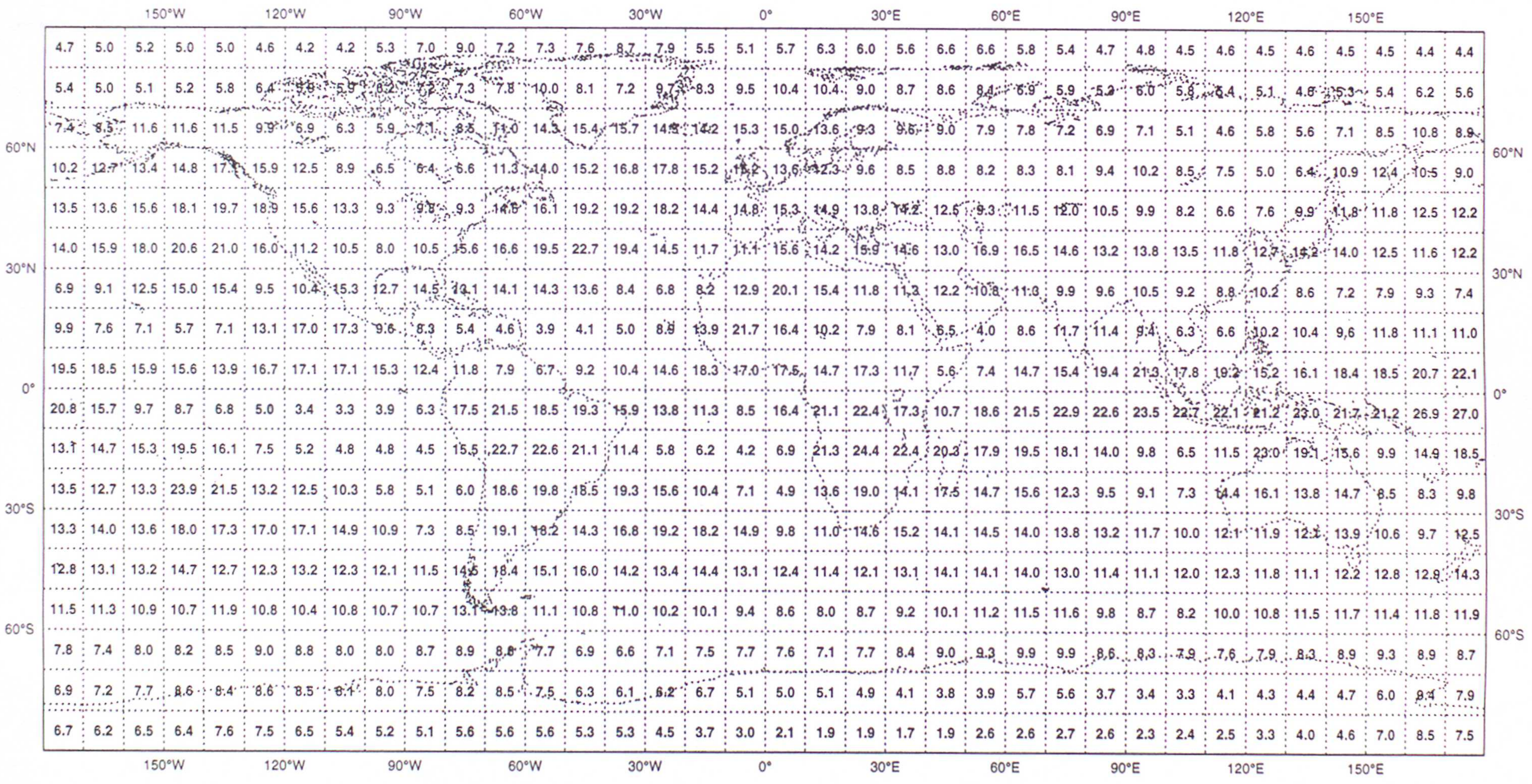
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 387 | 399 | 410 | 419 | 424 | 425 | 430 | 439 | 413 | 323 | 297 | 375 | 372 | 360 | 297 | 370 | 416 | 438 | 424 | 415 | 404 | 399 | 390 | 371 | 364 | 356 | 355 | 334 | 356 | 351 | 357 | 356 | 364 | 373 | 380 | 380 |
| 1139 | 1185 | 1177 | 1193 | 1213 | 1190 | 1160 | 1235 | 1204 | 970 | 1070 | 1135 | 1072 | 632 | 705 | 1101 | 1277 | 1283 | 1239 | 1109 | 1098 | 1084 | 1065 | 976 | 1002 | 1051 | 1065 | 977 | 857 | 883 | 977 | 998 | 996 | 1016 | 1054 | 1083 |
| 865 | 974 | 949 | 933 | 897 | 933 | 920 | 950 | 985 | 1020 | 1030 | 1002 | 1137 | 920 | 1001 | 1130 | 1132 | 1098 | 984 | 829 | 722 | 793 | 905 | 992 | 1012 | 1061 | 1095 | 988 | 993 | 955 | 913 | 671 | 665 | 691 | 683 | 684 |
| 750 | 869 | 979 | 1054 | 1058 | 1011 | 931 | 815 | 858 | 985 | 1055 | 1070 | 1082 | 1067 | 1076 | 1071 | 1079 | 988 | 829 | 724 | 730 | 836 | 957 | 1039 | 1082 | 1066 | 1022 | 955 | 948 | 889 | 1013 | 1022 | 1009 | 856 | 706 | 688 |
| 695 | 801 | 908 | 1001 | 1009 | 1014 | 953 | 904 | 896 | 949 | 1037 | 1075 | 1029 | 1036 | 1091 | 1041 | 1017 | 929 | 708 | 677 | 776 | 878 | 981 | 1044 | 1053 | 1016 | 903 | 613 | 714 | 931 | 1072 | 1089 | 1051 | 908 | 745 | 661 |
| 883 | 977 | 991 | 1035 | 1060 | 1027 | 948 | 927 | 956 | 929 | 999 | 1064 | 1019 | 1053 | 1081 | 1011 | 983 | 829 | 630 | 708 | 798 | 922 | 987 | 1011 | 1081 | 1036 | 998 | 860 | 849 | 1077 | 1089 | 1065 | 1083 | 852 | 748 | 816 |
| 862 | 1034 | 1006 | 1062 | 1063 | 1003 | 937 | 923 | 1008 | 928 | 939 | 980 | 961 | 1016 | 1083 | 1019 | 968 | 771 | 588 | 753 | 825 | 940 | 992 | 996 | 1016 | 986 | 978 | 857 | 951 | 1097 | 1068 | 1058 | 1064 | 901 | 753 | 788 |
| 657 | 921 | 912 | 1007 | 1028 | 955 | 924 | 877 | 984 | 928 | 898 | 964 | 935 | 1031 | 1083 | 1047 | 1004 | 739 | 609 | 780 | 843 | 1000 | 985 | 1001 | 1007 | 982 | 917 | 823 | 894 | 1075 | 985 | 959 | 1004 | 756 | 611 | 638 |
| 404 | 688 | 766 | 931 | 1007 | 976 | 973 | 844 | 931 | 976 | 937 | 932 | 1038 | 1039 | 1051 | 1051 | 955 | 659 | 622 | 753 | 871 | 1022 | 1015 | 1011 | 917 | 834 | 697 | 731 | 725 | 896 | 684 | 599 | 619 | 437 | 354 | 290 |
| 206 | 467 | 794 | 934 | 1038 | 1014 | 983 | 892 | 960 | 938 | 597 | 583 | 786 | 1007 | 1039 | 1069 | 907 | 601 | 604 | 523 | 623 | 907 | 862 | 746 | 745 | 621 | 671 | 685 | 511 | 241 | 614 | 258 | 398 | 277 | 167 | 171 |
| 168 | 344 | 587 | 804 | 1003 | 1010 | 1002 | 939 | 915 | 992 | 695 | 578 | 545 | 743 | 939 | 1066 | 844 | 581 | 701 | 616 | 592 | 673 | 473 | 657 | 879 | 762 | 766 | 913 | 911 | 616 | 491 | 400 | 560 | 694 | 406 | 250 |
| 521 | 513 | 691 | 864 | 966 | 1005 | 1018 | 1004 | 914 | 964 | 936 | 955 | 856 | 697 | 774 | 996 | 748 | 602 | 759 | 816 | 965 | 998 | 818 | 802 | 910 | 872 | 818 | 945 | 1026 | 930 | 911 | 856 | 772 | 1022 | 853 | 571 |
| 738 | 818 | 919 | 984 | 993 | 1032 | 1016 | 1029 | 930 | 929 | 1020 | 1049 | 1079 | 1051 | 991 | 949 | 679 | 614 | 779 | 882 | 1011 | 1040 | 1011 | 941 | 951 | 915 | 910 | 1032 | 1058 | 1023 | 995 | 998 | 1014 | 1097 | 970 | 751 |
| 722 | 818 | 936 | 1015 | 1029 | 1037 | 1071 | 1055 | 961 | 939 | 1012 | 1085 | 1092 | 1088 | 1048 | 862 | 687 | 703 | 813 | 957 | 1053 | 1055 | 1028 | 1010 | 972 | 926 | 937 | 1035 | 1076 | 1050 | 1077 | 1098 | 1083 | 1093 | 991 | 757 |
| 778 | 786 | 901 | 996 | 1053 | 1088 | 1109 | 1106 | 1027 | 964 | 1024 | 1083 | 1108 | 1098 | 982 | 815 | 729 | 789 | 925 | 1022 | 1084 | 1101 | 1090 | 1057 | 1005 | 979 | 1034 | 1105 | 1098 | 1088 | 1091 | 1104 | 1117 | 1110 | 1029 | 883 |
| 946 | 884 | 903 | 966 | 1039 | 1097 | 1152 | 1156 | 1119 | 1090 | 1093 | 1102 | 1101 | 1043 | 962 | 894 | 891 | 967 | 1071 | 1133 | 1167 | 1163 | 1140 | 1106 | 1076 | 1096 | 1117 | 1172 | 1164 | 1152 | 1151 | 1151 | 1149 | 1172 | 1136 | 1044 |
| 1184 | 1131 | 1110 | 1080 | 1086 | 1081 | 1135 | 1179 | 1167 | 1125 | 1047 | 1033 | 1071 | 1084 | 1078 | 1097 | 1081 | 1133 | 1155 | 1209 | 1234 | 1242 | 1167 | 1184 | 1273 | 1291 | 1277 | 1176 | 1243 | 1230 | 1183 | 1209 | 1228 | 1256 | 1266 | 1213 |
| 404 | 410 | 391 | 365 | 366 | 362 | 370 | 382 | 381 | 381 | 371 | 352 | 365 | 378 | 388 | 398 | 400 | 399 | 412 | 433 | 446 | 449 | 450 | 441 | 440 | 433 | 443 | 446 | 454 | 448 | 452 | 449 | 443 | 445 | 430 | 402 |

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



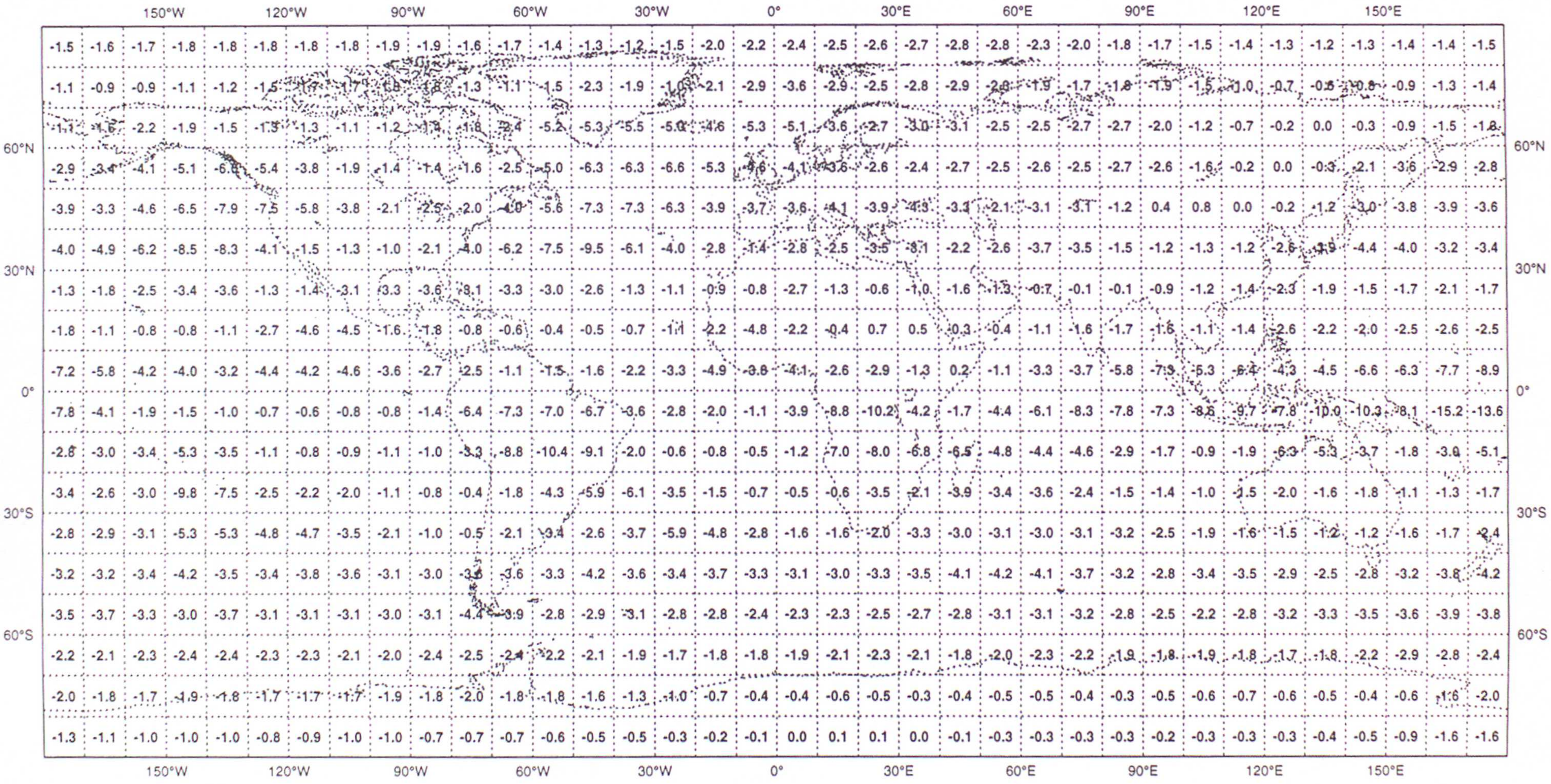
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -12.1 | -12.6 | -13.0 | -13.5 | -14.5 | -14.3 | -14.2 | -13.6 | -13.1 | -12.0 | -8.9 | -10.4 | -9.7 | -9.0 | -7.8 | -10.4 | -13.7 | -15.2 | -15.8 | -15.8 | -16.2 | -17.0 | -17.1 | -17.6 | -15.6 | -13.3 | -12.8 | -12.2 | -11.2 | -10.8 | -10.2 | -9.6 | -9.6 | -10.0 | -10.6 | -11.2 |
| -11.0 | -10.5 | -10.2 | -10.7 | -11.7 | -12.8 | -13.8 | -14.3 | -14.4 | -11.6 | -7.7 | -6.4 | -6.0 | -7.7 | -6.5 | -3.4 | -12.0 | -15.2 | -18.1 | -15.1 | -13.7 | -15.0 | -15.1 | -11.9 | -10.1 | -9.6 | -10.1 | -10.7 | -10.0 | -9.2 | -7.2 | -7.7 | -7.9 | -7.0 | -9.7 | -11.0 |
| -9.9 | -10.0 | -9.5 | -6.7 | -7.0 | -8.9 | -11.1 | -9.9 | -10.6 | -9.5 | -10.7 | -10.9 | -18.9 | -14.8 | -18.1 | -18.0 | -17.6 | -20.4 | -20.1 | -14.0 | -12.9 | -13.7 | -13.6 | -11.7 | -11.0 | -12.5 | -12.4 | -8.9 | -8.5 | -8.0 | -5.0 | -2.5 | -3.9 | -7.1 | -9.1 | -9.8 |
| -15.1 | -15.6 | -16.8 | -18.9 | -19.7 | -14.5 | -11.7 | -8.7 | -8.7 | -8.9 | -9.5 | -10.3 | -19.6 | -23.0 | -21.5 | -21.7 | -18.4 | -16.2 | -14.8 | -14.0 | -11.1 | -10.6 | -11.4 | -10.7 | -11.7 | -11.5 | -11.1 | -9.5 | -7.5 | -1.5 | -2.9 | -3.9 | -12.6 | -17.4 | -15.5 | -16.4 |
| -16.3 | -14.5 | -17.5 | -20.9 | -23.0 | -20.6 | -15.2 | -10.9 | -7.7 | -11.7 | -9.3 | -18.9 | -19.6 | -23.8 | -22.7 | -19.7 | -14.1 | -13.4 | -12.9 | -14.1 | -12.9 | -14.9 | -11.7 | -10.6 | -12.2 | -10.0 | -4.4 | 1.7 | 2.7 | -1.7 | -3.7 | -8.7 | -15.8 | -18.7 | -17.6 | -16.4 |
| -15.9 | -17.5 | -20.3 | -24.4 | -22.7 | -12.2 | -4.0 | -3.3 | -3.9 | -7.3 | -15.8 | -22.3 | -22.6 | -25.8 | -17.6 | -13.9 | -10.6 | -5.5 | -11.1 | -9.5 | -12.3 | -10.0 | -6.5 | -7.9 | -10.0 | -9.2 | -4.8 | -3.7 | -3.8 | -4.6 | -12.6 | -17.2 | -18.2 | -17.3 | -14.1 | -14.2 |
| -6.6 | -8.0 | -9.6 | -11.6 | -11.4 | -5.5 | -5.0 | -8.2 | -10.8 | -11.4 | -11.4 | -11.4 | -10.1 | -8.7 | -5.7 | -5.7 | -4.3 | -3.1 | -7.6 | -3.4 | -1.9 | -3.2 | -5.0 | -4.7 | -2.1 | -0.1 | 0.0 | -2.7 | -4.2 | -5.1 | -10.9 | -9.3 | -7.7 | -8.1 | -9.1 | -8.0 |
| -6.5 | -4.4 | -3.7 | -3.8 | -4.8 | -8.5 | -12.9 | -12.0 | -5.2 | -6.7 | -3.4 | -2.9 | -2.6 | -3.2 | -3.9 | -4.5 | -6.8 | -13.3 | -6.5 | -0.7 | 2.7 | 1.5 | -1.7 | -2.5 | -4.0 | -4.2 | -4.6 | -5.2 | -4.3 | -5.3 | -8.9 | -7.5 | -6.3 | -7.5 | -8.4 | -8.6 |
| -18.5 | -14.8 | -11.6 | -11.1 | -9.1 | -11.6 | -11.1 | -12.4 | -10.2 | -8.2 | -7.6 | -4.2 | -5.5 | -5.2 | -6.9 | -9.3 | -12.9 | -11.6 | -12.3 | -7.4 | -7.7 | -3.6 | 0.4 | -3.9 | -8.8 | -9.9 | -14.9 | -18.4 | -14.4 | -16.7 | -12.2 | -12.2 | -17.4 | -16.6 | -19.5 | -21.7 |
| -19.2 | -10.4 | -5.1 | -4.5 | -3.7 | -3.2 | -3.4 | -4.0 | -3.9 | -5.4 | -17.4 | -18.9 | -18.9 | -18.2 | -10.3 | -8.0 | -6.3 | -4.6 | -11.3 | -22.8 | -25.1 | -10.9 | -5.2 | -11.5 | -15.1 | -20.4 | -19.6 | -18.4 | -21.6 | -24.7 | -20.4 | -24.9 | -25.8 | -20.9 | -34.4 | -31.8 |
| -8.1 | -8.1 | -9.5 | -13.9 | -10.1 | -4.3 | -4.5 | -5.8 | -7.4 | -7.2 | -9.7 | -22.0 | -26.8 | -24.1 | -6.4 | -2.8 | -3.9 | -3.6 | -5.3 | -18.3 | -20.0 | -17.3 | -16.5 | -12.4 | -11.2 | -12.2 | -8.7 | -6.1 | -3.7 | -5.9 | -18.2 | -14.6 | -11.0 | -6.3 | -8.5 | -13.9 |
| -10.6 | -9.0 | -9.6 | -24.4 | -20.1 | -8.0 | -7.4 | -7.5 | -6.6 | -6.0 | -4.2 | -5.6 | -11.3 | -16.0 | -16.2 | -9.9 | -5.0 | -3.3 | -3.1 | -2.1 | -9.5 | -6.4 | -10.8 | -10.1 | -10.6 | -7.8 | -6.2 | -7.0 | -5.4 | -4.6 | -6.0 | -5.7 | -6.3 | -4.7 | -5.3 | -6.3 |
| -9.8 | -10.6 | -11.0 | -16.0 | -15.3 | -14.2 | -14.4 | -11.6 | -8.3 | -5.3 | -3.4 | -6.0 | -9.6 | -8.6 | -11.4 | -16.3 | -14.1 | -10.0 | -7.3 | -7.0 | -7.7 | -11.1 | -10.0 | -10.2 | -9.9 | -10.5 | -10.9 | -9.6 | -8.6 | -6.2 | -5.6 | -4.7 | -4.0 | -6.7 | -7.3 | -8.9 |
| -12.3 | -12.0 | -12.5 | -14.3 | -12.6 | -11.8 | -13.3 | -13.1 | -12.1 | -11.8 | -13.7 | -12.3 | -12.0 | -14.6 | -12.4 | -11.9 | -13.1 | -12.2 | -12.7 | -13.0 | -13.9 | -13.7 | -14.2 | -14.1 | -13.8 | -13.4 | -12.7 | -11.9 | -13.5 | -13.5 | -11.4 | -10.0 | -10.8 | -11.7 | -13.3 | -14.2 |
| -14.7 | -14.8 | -13.5 | -12.8 | -14.2 | -13.0 | -12.9 | -13.4 | -13.5 | -14.5 | -18.3 | -15.6 | -12.9 | -13.0 | -13.0 | -12.7 | -13.1 | -12.0 | -12.4 | -12.5 | -13.4 | -14.0 | -14.0 | -14.1 | -13.3 | -13.9 | -13.3 | -12.9 | -11.7 | -13.2 | -14.4 | -14.3 | -14.1 | -14.4 | -14.7 | -14.8 |
| -12.8 | -12.2 | -12.3 | -12.2 | -11.7 | -11.4 | -12.1 | -12.0 | -11.7 | -12.8 | -12.7 | -12.0 | -11.6 | -11.8 | -11.6 | -11.2 | -11.3 | -11.4 | -12.3 | -12.9 | -13.5 | -12.4 | -10.3 | -11.0 | -12.5 | -11.9 | -10.3 | -9.4 | -10.0 | -9.9 | -9.8 | -9.7 | -11.3 | -13.4 | -13.3 | -12.6 |
| -12.0 | -11.5 | -10.7 | -10.8 | -9.3 | -8.8 | -8.7 | -8.8 | -9.5 | -9.5 | -10.4 | -9.9 | -11.4 | -11.1 | -9.8 | -7.8 | -5.7 | -2.9 | -2.7 | -3.3 | -2.8 | -2.0 | -2.4 | -2.9 | -2.7 | -2.5 | -1.8 | -2.4 | -2.8 | -3.5 | -3.3 | -2.6 | -2.2 | -3.3 | -8.7 | -11.5 |
| -8.5 | -8.2 | -7.8 | -7.1 | -6.0 | -4.7 | -5.0 | -5.8 | -5.9 | -4.9 | -5.7 | -6.0 | -5.3 | -4.7 | -4.4 | -3.2 | -2.3 | -2.0 | -1.2 | -0.5 | -0.1 | -0.4 | -0.9 | -1.8 | -1.8 | -1.7 | -1.9 | -1.6 | -1.8 | -1.8 | -2.1 | -2.3 | -2.9 | -4.9 | -9.3 | -9.8 |

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4.7 | 5.0 | 5.2 | 5.0 | 5.0 | 4.6 | 4.2 | 4.2 | 5.3 | 7.0 | 9.0 | 7.2 | 7.3 | 7.6 | 8.7 | 7.9 | 5.5 | 5.1 | 5.7 | 6.3 | 6.0 | 5.6 | 6.6 | 6.6 | 5.8 | 5.4 | 4.7 | 4.8 | 4.5 | 4.6 | 4.5 | 4.6 | 4.5 | 4.5 | 4.4 | 4.4 |
| 5.4 | 5.0 | 5.1 | 5.2 | 5.8 | 6.4 | 5.8 | 5.9 | 8.2 | 7.2 | 7.3 | 7.8 | 10.0 | 8.1 | 7.2 | 9.7 | 8.3 | 9.5 | 10.4 | 10.4 | 9.0 | 8.7 | 8.6 | 8.4 | 6.9 | 5.9 | 5.2 | 6.0 | 5.8 | 6.4 | 5.1 | 4.8 | 5.3 | 5.4 | 6.2 | 5.6 |
| 7.4 | 8.5 | 11.6 | 11.6 | 11.5 | 9.9 | 6.9 | 6.3 | 5.9 | 7.1 | 8.5 | 11.0 | 14.3 | 15.4 | 15.7 | 14.5 | 14.2 | 15.3 | 15.0 | 13.6 | 9.3 | 9.6 | 9.0 | 7.9 | 7.8 | 7.2 | 6.9 | 7.1 | 5.1 | 4.6 | 5.8 | 5.6 | 7.1 | 8.5 | 10.8 | 8.9 |
| 10.2 | 12.7 | 13.4 | 14.8 | 17.[illegible] | 15.9 | 12.5 | 8.9 | 6.5 | 6.4 | 6.6 | 11.3 | 14.0 | 15.2 | 16.8 | 17.8 | 15.2 | 15.2 | 13.6 | 12.3 | 9.6 | 8.5 | 8.8 | 8.2 | 8.3 | 8.1 | 9.4 | 10.2 | 8.5 | 7.5 | 5.0 | 6.4 | 10.9 | 12.4 | 10.5 | 9.0 |
| 13.5 | 13.6 | 15.6 | 18.1 | 19.7 | 18.9 | 15.6 | 13.3 | 9.3 | 9.8 | 9.3 | 14.6 | 16.1 | 19.2 | 19.2 | 18.2 | 14.4 | 14.8 | 15.3 | 14.9 | 13.8 | 14.2 | 12.5 | 9.3 | 11.5 | 12.0 | 10.5 | 9.9 | 8.2 | 6.6 | 7.6 | 9.9 | 11.8 | 11.8 | 12.5 | 12.2 |
| 14.0 | 15.9 | 18.0 | 20.6 | 21.0 | 16.0 | 11.2 | 10.5 | 8.0 | 10.5 | 15.6 | 16.6 | 19.5 | 22.7 | 19.4 | 14.5 | 11.7 | 11.1 | 15.6 | 14.2 | 15.9 | 14.6 | 13.0 | 16.9 | 16.5 | 14.6 | 13.2 | 13.8 | 13.5 | 11.8 | 12.7 | 15.2 | 14.0 | 12.5 | 11.6 | 12.2 |
| 6.9 | 9.1 | 12.5 | 15.0 | 15.4 | 9.5 | 10.4 | 15.3 | 12.7 | 14.5 | 13.1 | 14.1 | 14.3 | 13.6 | 8.4 | 6.8 | 8.2 | 12.9 | 20.1 | 15.4 | 11.8 | 11.3 | 12.2 | 10.8 | 11.0 | 9.9 | 9.6 | 10.5 | 9.2 | 8.8 | 10.2 | 8.6 | 7.2 | 7.9 | 9.3 | 7.4 |
| 9.9 | 7.6 | 7.1 | 5.7 | 7.1 | 13.1 | 17.0 | 17.3 | 9.6 | 8.3 | 5.4 | 4.6 | 3.9 | 4.1 | 5.0 | 8.9 | 13.9 | 21.7 | 16.4 | 10.2 | 7.9 | 8.1 | 6.5 | 4.0 | 8.6 | 11.7 | 11.4 | 9.4 | 6.3 | 6.6 | 10.2 | 10.4 | 9.6 | 11.8 | 11.1 | 11.0 |
| 19.5 | 18.5 | 15.9 | 15.6 | 13.9 | 16.7 | 17.1 | 17.1 | 15.3 | 12.4 | 11.8 | 7.9 | 6.7 | 9.2 | 10.4 | 14.6 | 18.3 | 17.0 | 17.5 | 14.7 | 17.3 | 11.7 | 5.6 | 7.4 | 14.7 | 15.4 | 19.4 | 21.3 | 17.8 | 19.2 | 15.2 | 16.1 | 18.4 | 18.5 | 20.7 | 22.1 |
| 20.8 | 15.7 | 9.7 | 8.7 | 6.8 | 5.0 | 3.4 | 3.3 | 3.9 | 6.3 | 17.5 | 21.5 | 18.5 | 19.3 | 15.9 | 13.8 | 11.3 | 8.5 | 16.4 | 21.1 | 22.4 | 17.3 | 10.7 | 18.6 | 21.5 | 22.9 | 22.6 | 23.5 | 22.7 | 22.1 | 21.2 | 23.0 | 21.7 | 21.2 | 26.9 | 27.0 |
| 13.1 | 14.7 | 15.3 | 19.5 | 16.1 | 7.5 | 5.2 | 4.8 | 4.8 | 4.5 | 15.5 | 22.7 | 22.6 | 21.1 | 11.4 | 5.8 | 6.2 | 4.2 | 6.9 | 21.3 | 24.4 | 22.4 | 20.3 | 17.9 | 19.5 | 18.1 | 14.0 | 9.8 | 6.5 | 11.5 | 23.0 | 19.1 | 15.6 | 9.9 | 14.9 | 18.5 |
| 13.5 | 12.7 | 13.3 | 23.9 | 21.5 | 13.2 | 12.5 | 10.3 | 5.8 | 5.1 | 6.0 | 18.6 | 19.8 | 18.5 | 19.3 | 15.6 | 10.4 | 7.1 | 4.9 | 13.6 | 19.0 | 14.1 | 17.5 | 14.7 | 15.6 | 12.3 | 9.5 | 9.1 | 7.3 | 14.4 | 16.1 | 13.8 | 14.7 | 8.5 | 8.3 | 9.8 |
| 13.3 | 14.0 | 13.6 | 18.0 | 17.3 | 17.0 | 17.1 | 14.9 | 10.9 | 7.3 | 8.5 | 19.1 | 18.2 | 14.3 | 16.8 | 19.2 | 18.2 | 14.9 | 9.8 | 11.0 | 14.6 | 15.2 | 14.1 | 14.5 | 14.0 | 13.8 | 13.2 | 11.7 | 10.0 | 12.1 | 11.9 | 12.1 | 13.9 | 10.6 | 9.7 | 12.5 |
| 12.8 | 13.1 | 13.2 | 14.7 | 12.7 | 12.3 | 13.2 | 12.3 | 12.1 | 11.5 | 14.5 | 18.4 | 15.1 | 16.0 | 14.2 | 13.4 | 14.4 | 13.1 | 12.4 | 11.4 | 12.1 | 13.1 | 14.1 | 14.1 | 14.0 | 13.0 | 11.4 | 11.1 | 12.0 | 12.3 | 11.8 | 11.1 | 12.2 | 12.8 | 12.9 | 14.3 |
| 11.5 | 11.3 | 10.9 | 10.7 | 11.9 | 10.8 | 10.4 | 10.8 | 10.7 | 10.7 | 13.1 | 13.8 | 11.1 | 10.8 | 11.0 | 10.2 | 10.1 | 9.4 | 8.6 | 8.0 | 8.7 | 9.2 | 10.1 | 11.2 | 11.5 | 11.6 | 9.8 | 8.7 | 8.2 | 10.0 | 10.8 | 11.5 | 11.7 | 11.4 | 11.8 | 11.9 |
| 7.8 | 7.4 | 8.0 | 8.2 | 8.5 | 9.0 | 8.8 | 8.0 | 8.0 | 8.7 | 8.9 | 8.8 | 7.7 | 6.9 | 6.6 | 7.1 | 7.5 | 7.7 | 7.6 | 7.1 | 7.7 | 8.4 | 9.0 | 9.3 | 9.9 | 9.9 | 8.6 | 8.3 | 7.9 | 7.6 | 7.9 | 8.3 | 8.9 | 9.3 | 8.9 | 8.7 |
| 6.9 | 7.2 | 7.7 | 8.6 | 8.4 | 8.6 | 8.5 | 8.1 | 8.0 | 7.5 | 8.2 | 8.5 | 7.5 | 6.3 | 6.1 | 6.2 | 6.7 | 5.1 | 5.0 | 5.1 | 4.9 | 4.1 | 3.8 | 3.9 | 5.7 | 5.6 | 3.7 | 3.4 | 3.3 | 4.1 | 4.3 | 4.4 | 4.7 | 6.0 | 8.4 | 7.9 |
| 6.7 | 6.2 | 6.5 | 6.4 | 7.6 | 7.5 | 6.5 | 5.4 | 5.2 | 5.1 | 5.6 | 5.6 | 5.6 | 5.3 | 5.3 | 4.5 | 3.7 | 3.0 | 2.1 | 1.9 | 1.9 | 1.7 | 1.9 | 2.6 | 2.6 | 2.7 | 2.6 | 2.3 | 2.4 | 2.5 | 3.3 | 4.0 | 4.6 | 7.0 | 8.5 | 7.5 |

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -1.5 | -1.6 | -1.7 | -1.8 | -1.8 | -1.8 | -1.8 | -1.8 | -1.9 | -1.9 | -1.6 | -1.7 | -1.4 | -1.3 | -1.2 | -1.5 | -2.0 | -2.2 | -2.4 | -2.5 | -2.6 | -2.7 | -2.8 | -2.8 | -2.3 | -2.0 | -1.8 | -1.7 | -1.5 | -1.4 | -1.3 | -1.2 | -1.3 | -1.4 | -1.4 | -1.5 |
| -1.1 | -0.9 | -0.9 | -1.1 | -1.2 | -1.5 | -1.7 | -1.7 | -1.8 | -1.8 | -1.3 | -1.1 | -1.5 | -2.3 | -1.9 | -1.0 | -2.1 | -2.9 | -3.6 | -2.9 | -2.5 | -2.8 | -2.9 | -2.8 | -1.9 | -1.7 | -1.8 | -1.9 | -1.5 | -1.0 | -0.7 | -0.5 | -0.8 | -0.9 | -1.3 | -1.4 |
| -1.1 | -1.6 | -2.2 | -1.9 | -1.5 | -1.3 | -1.3 | -1.1 | -1.2 | -1.4 | -1.8 | -2.4 | -5.2 | -5.3 | -5.5 | -5.0 | -4.6 | -5.3 | -5.1 | -3.6 | -2.7 | -3.0 | -3.1 | -2.5 | -2.5 | -2.7 | -2.7 | -2.0 | -1.2 | -0.7 | -0.2 | 0.0 | -0.3 | -0.9 | -1.5 | -1.8 |
| -2.9 | -3.4 | -4.1 | -5.1 | -6.8 | -5.4 | -3.8 | -1.9 | -1.4 | -1.4 | -1.6 | -2.5 | -5.0 | -6.3 | -6.3 | -6.6 | -5.3 | -4.6 | -4.1 | -3.6 | -2.6 | -2.4 | -2.7 | -2.5 | -2.6 | -2.5 | -2.7 | -2.6 | -1.6 | -0.2 | 0.0 | -0.3 | -2.1 | -3.6 | -2.9 | -2.8 |
| -3.9 | -3.3 | -4.6 | -6.5 | -7.9 | -7.5 | -5.8 | -3.8 | -2.1 | -2.5 | -2.0 | -4.0 | -5.6 | -7.3 | -7.3 | -6.3 | -3.9 | -3.7 | -3.6 | -4.1 | -3.9 | -4.3 | -3.3 | -2.1 | -3.1 | -3.1 | -1.2 | 0.4 | 0.8 | 0.0 | -0.2 | -1.2 | -3.0 | -3.8 | -3.9 | -3.6 |
| -4.0 | -4.9 | -6.2 | -8.5 | -8.3 | -4.1 | -1.5 | -1.3 | -1.0 | -2.1 | -4.0 | -6.2 | -7.5 | -9.5 | -6.1 | -4.0 | -2.8 | -1.4 | -2.8 | -2.5 | -3.5 | -8.1 | -2.2 | -2.6 | -3.7 | -3.5 | -1.5 | -1.2 | -1.3 | -1.2 | -2.6 | -3.9 | -4.4 | -4.0 | -3.2 | -3.4 |
| -1.3 | -1.8 | -2.5 | -3.4 | -3.6 | -1.3 | -1.4 | -3.1 | -3.3 | -3.6 | -8.1 | -3.3 | -3.0 | -2.6 | -1.3 | -1.1 | -0.9 | -0.8 | -2.7 | -1.3 | -0.6 | -1.0 | -1.6 | -1.3 | -0.7 | -0.1 | -0.1 | -0.9 | -1.2 | -1.4 | -2.3 | -1.9 | -1.5 | -1.7 | -2.1 | -1.7 |
| -1.8 | -1.1 | -0.8 | -0.8 | -1.1 | -2.7 | -4.6 | -4.5 | -1.6 | -1.8 | -0.8 | -0.6 | -0.4 | -0.5 | -0.7 | -1.1 | -2.2 | -4.8 | -2.2 | -0.4 | 0.7 | 0.5 | -0.3 | -0.4 | -1.1 | -1.6 | -1.7 | -1.6 | -1.1 | -1.4 | -2.6 | -2.2 | -2.0 | -2.5 | -2.6 | -2.5 |
| -7.2 | -5.8 | -4.2 | -4.0 | -3.2 | -4.4 | -4.2 | -4.6 | -3.6 | -2.7 | -2.5 | -1.1 | -1.5 | -1.6 | -2.2 | -3.3 | -4.9 | -3.8 | -4.1 | -2.6 | -2.9 | -1.3 | 0.2 | -1.1 | -3.3 | -3.7 | -5.8 | -7.3 | -5.3 | -6.4 | -4.3 | -4.5 | -6.6 | -6.3 | -7.7 | -8.9 |
| -7.8 | -4.1 | -1.9 | -1.5 | -1.0 | -0.7 | -0.6 | -0.8 | -0.8 | -1.4 | -6.4 | -7.3 | -7.0 | -6.7 | -3.6 | -2.8 | -2.0 | -1.1 | -3.9 | -8.8 | -10.2 | -4.2 | -1.7 | -4.4 | -6.1 | -8.3 | -7.8 | -7.3 | -8.6 | -9.7 | -7.8 | -10.0 | -10.3 | -8.1 | -15.2 | -13.6 |
| -2.8 | -3.0 | -3.4 | -5.3 | -3.5 | -1.1 | -0.8 | -0.9 | -1.1 | -1.0 | -3.3 | -8.8 | -10.4 | -9.1 | -2.0 | -0.6 | -0.8 | -0.5 | -1.2 | -7.0 | -8.0 | -6.8 | -6.5 | -4.8 | -4.4 | -4.6 | -2.9 | -1.7 | -0.9 | -1.9 | -6.3 | -5.3 | -3.7 | -1.8 | -3.9 | -5.1 |
| -3.4 | -2.6 | -3.0 | -9.8 | -7.5 | -2.5 | -2.2 | -2.0 | -1.1 | -0.8 | -0.4 | -1.8 | -4.3 | -5.9 | -6.1 | -3.5 | -1.5 | -0.7 | -0.5 | -0.6 | -3.5 | -2.1 | -3.9 | -3.4 | -3.6 | -2.4 | -1.5 | -1.4 | -1.0 | -1.5 | -2.0 | -1.6 | -1.8 | -1.1 | -1.3 | -1.7 |
| -2.8 | -2.9 | -3.1 | -5.3 | -5.3 | -4.8 | -4.7 | -3.5 | -2.1 | -1.0 | -0.5 | -2.1 | -3.4 | -2.6 | -3.7 | -5.9 | -4.8 | -2.8 | -1.6 | -1.6 | -2.0 | -3.3 | -3.0 | -3.1 | -3.0 | -3.1 | -3.2 | -2.5 | -1.9 | -1.6 | -1.5 | -1.2 | -1.2 | -1.6 | -1.7 | -2.4 |
| -3.2 | -3.2 | -3.4 | -4.2 | -3.5 | -3.4 | -3.8 | -3.6 | -3.1 | -3.0 | -3.6 | -3.6 | -3.3 | -4.2 | -3.6 | -3.4 | -3.7 | -3.3 | -3.1 | -3.0 | -3.3 | -3.5 | -4.1 | -4.2 | -4.1 | -3.7 | -3.2 | -2.8 | -3.4 | -3.5 | -2.9 | -2.5 | -2.8 | -3.2 | -3.8 | -4.2 |
| -3.5 | -3.7 | -3.3 | -3.0 | -3.7 | -3.1 | -3.1 | -3.1 | -3.0 | -3.1 | -4.4 | -3.9 | -2.8 | -2.9 | -3.1 | -2.8 | -2.8 | -2.4 | -2.3 | -2.3 | -2.5 | -2.7 | -2.8 | -3.1 | -3.1 | -3.2 | -2.8 | -2.5 | -2.2 | -2.8 | -3.2 | -3.3 | -3.5 | -3.6 | -3.9 | -3.8 |
| -2.2 | -2.1 | -2.3 | -2.4 | -2.4 | -2.3 | -2.3 | -2.1 | -2.0 | -2.4 | -2.5 | -2.4 | -2.2 | -2.1 | -1.9 | -1.7 | -1.8 | -1.8 | -1.9 | -2.1 | -2.3 | -2.1 | -1.8 | -2.0 | -2.3 | -2.2 | -1.9 | -1.8 | -1.9 | -1.8 | -1.7 | -1.8 | -2.2 | -2.9 | -2.8 | -2.4 |
| -2.0 | -1.8 | -1.7 | -1.9 | -1.8 | -1.7 | -1.7 | -1.7 | -1.9 | -1.8 | -2.0 | -1.8 | -1.8 | -1.6 | -1.3 | -1.0 | -0.7 | -0.4 | -0.4 | -0.6 | -0.5 | -0.3 | -0.4 | -0.5 | -0.5 | -0.4 | -0.3 | -0.5 | -0.6 | -0.7 | -0.6 | -0.5 | -0.4 | -0.6 | -1.6 | -2.0 |
| -1.3 | -1.1 | -1.0 | -1.0 | -1.0 | -0.8 | -0.9 | -1.0 | -1.0 | -0.7 | -0.7 | -0.7 | -0.6 | -0.5 | -0.5 | -0.3 | -0.2 | -0.1 | 0.0 | 0.1 | 0.1 | 0.0 | -0.1 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.4 | -0.5 | -0.9 | -1.6 | -1.6 |

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

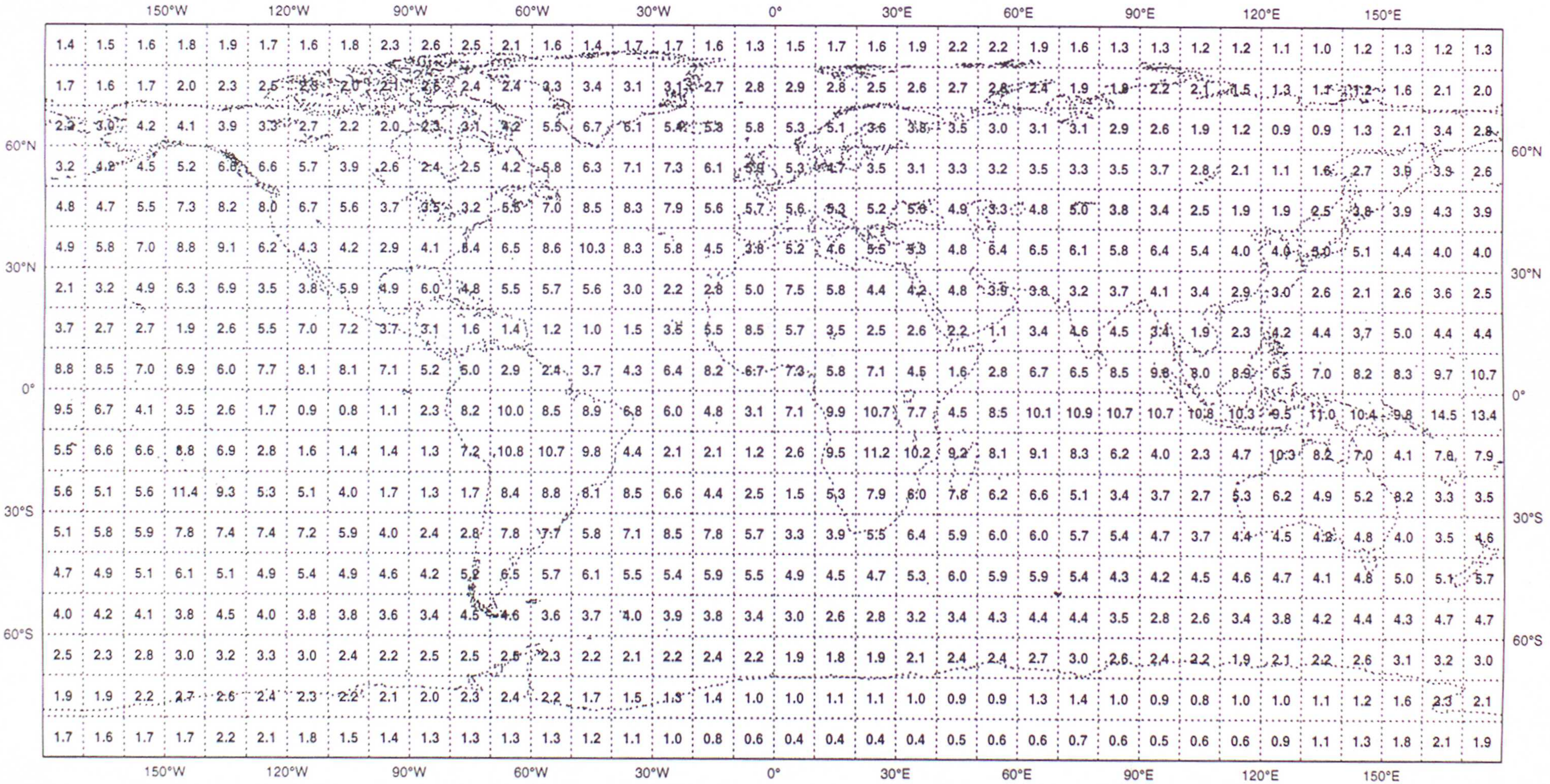
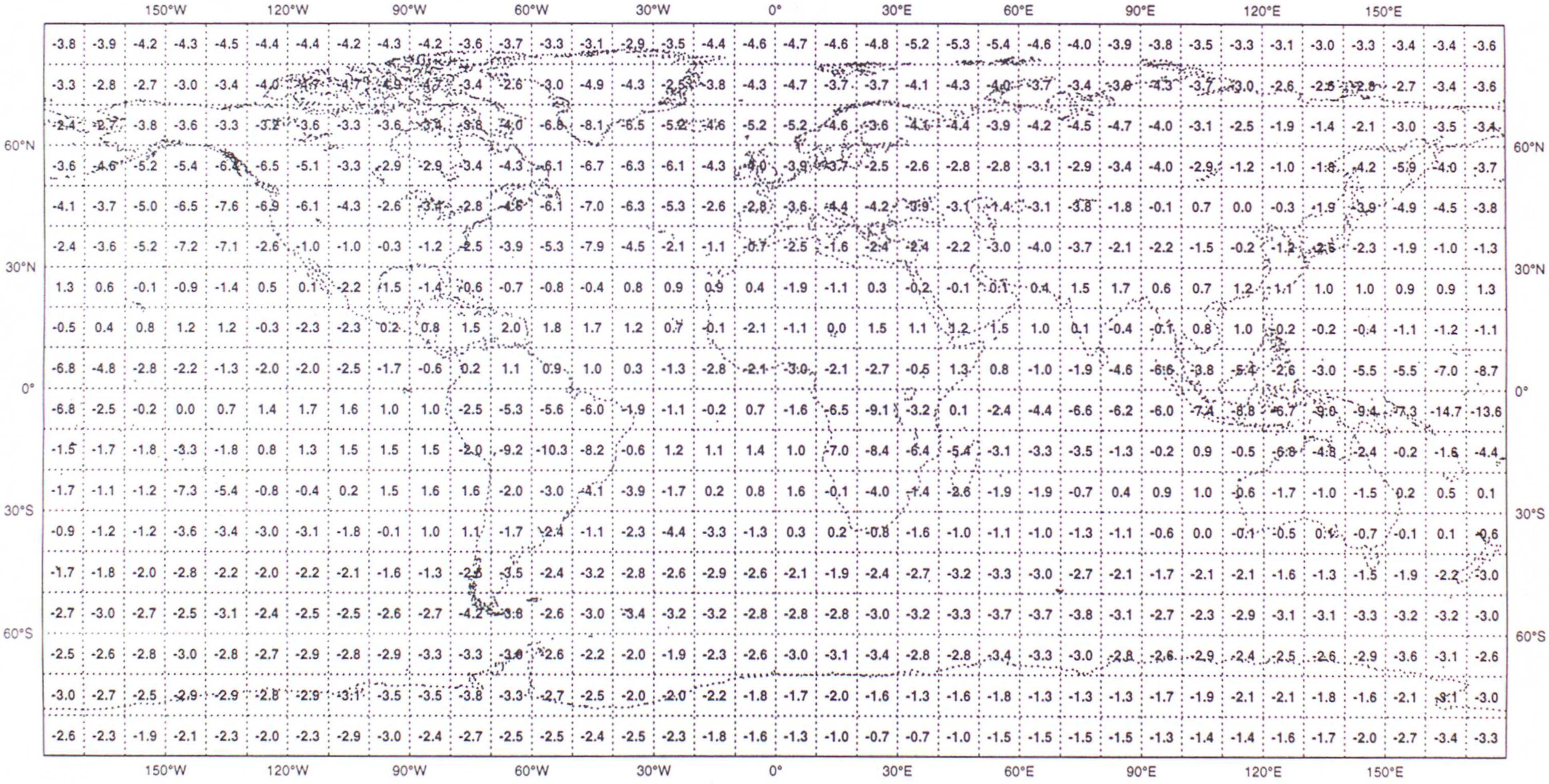
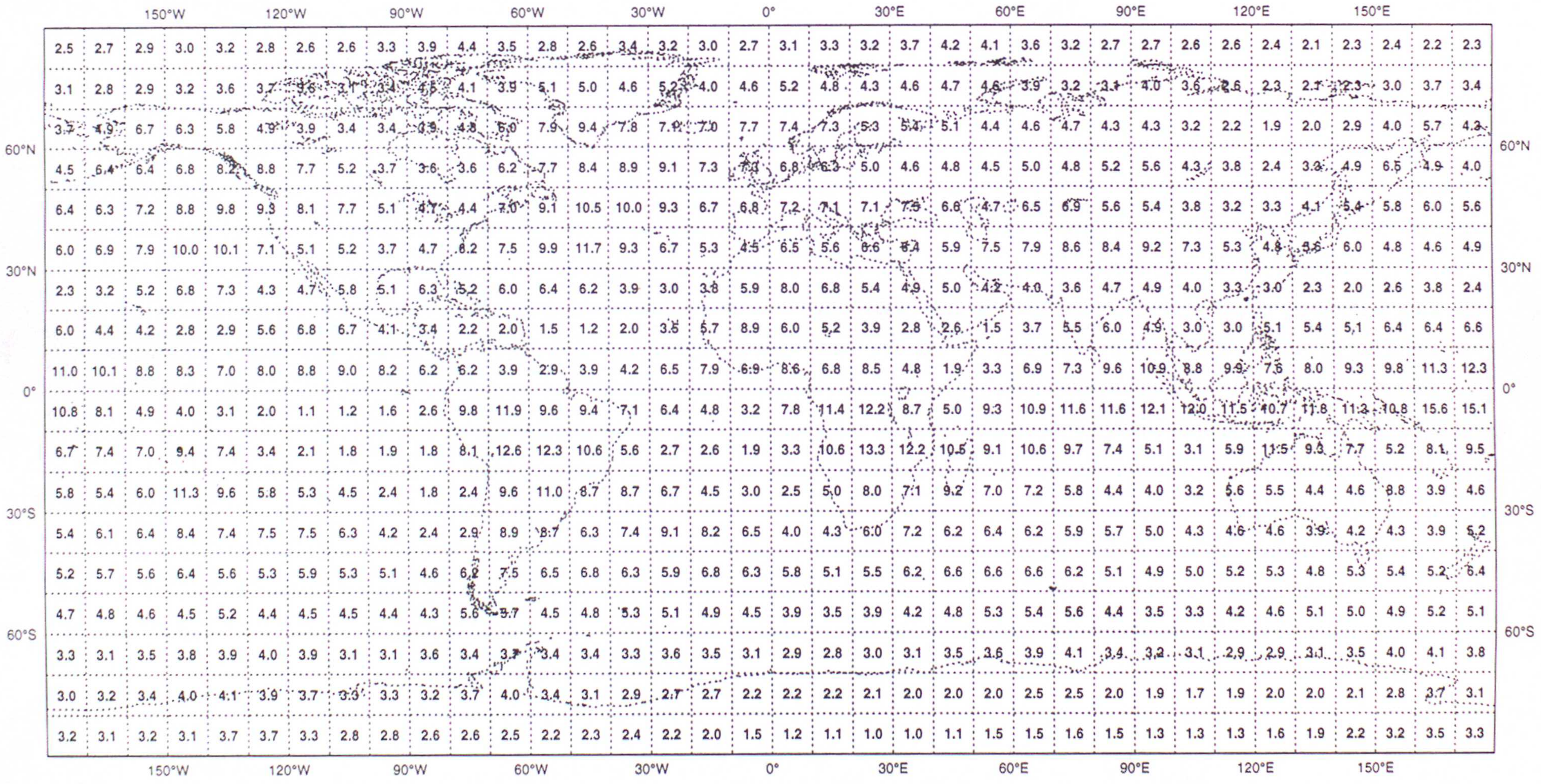

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
1.4 1.5 1.6 1.8 1.9 1.7 1.6 1.8 2.3 2.6 2.5 2.1 1.6 1.4 1.7 1.7 1.6 1.3 1.5 1.7 1.6 1.9 2.2 2.2 1.9 1.6 1.3 1.3 1.2 1.2 1.1 1.0 1.2 1.3 1.2 1.3
1.7 1.6 1.7 2.0 2.3 2.5 2.8 2.0 2.1 2.6 2.4 2.4 3.3 3.4 3.1 3.1 2.7 2.8 2.9 2.8 2.5 2.6 2.7 2.8 2.4 1.9 1.9 2.2 2.1 1.5 1.3 1.1 1.2 1.6 2.1 2.0
2.2 3.0 4.2 4.1 3.9 3.3 2.7 2.2 2.0 2.3 3.1 4.2 5.5 6.7 6.1 5.4 5.3 5.8 5.3 5.1 3.6 3.8 3.5 3.0 3.1 3.1 2.9 2.6 1.9 1.2 0.9 0.9 1.3 2.1 3.4 2.8
3.2 4.2 4.5 5.2 6.8 6.6 5.7 3.9 2.6 2.4 2.5 4.2 5.8 6.3 7.1 7.3 6.1 5.9 5.3 4.7 3.5 3.1 3.3 3.2 3.5 3.3 3.5 3.7 2.8 2.1 1.1 1.6 2.7 3.9 3.9 2.6
4.8 4.7 5.5 7.3 8.2 8.0 6.7 5.6 3.7 3.5 3.2 5.5 7.0 8.5 8.3 7.9 5.6 5.7 5.6 5.3 5.2 5.6 4.9 3.3 4.8 5.0 3.8 3.4 2.5 1.9 1.9 2.5 3.8 3.9 4.3 3.9
4.9 5.8 7.0 8.8 9.1 6.2 4.3 4.2 2.9 4.1 6.4 6.5 8.6 10.3 8.3 5.8 4.5 3.8 5.2 4.6 5.5 5.3 4.8 6.4 6.5 6.1 5.8 6.4 5.4 4.0 4.0 5.0 5.1 4.4 4.0 4.0
2.1 3.2 4.9 6.3 6.9 3.5 3.8 5.9 4.9 6.0 4.8 5.5 5.7 5.6 3.0 2.2 2.8 5.0 7.5 5.8 4.4 4.2 4.8 3.9 3.8 3.2 3.7 4.1 3.4 2.9 3.0 2.6 2.1 2.6 3.6 2.5
3.7 2.7 2.7 1.9 2.6 5.5 7.0 7.2 3.7 3.1 1.6 1.4 1.2 1.0 1.5 3.5 5.5 8.5 5.7 3.5 2.5 2.6 2.2 1.1 3.4 4.6 4.5 3.4 1.9 2.3 4.2 4.4 3.7 5.0 4.4 4.4
8.8 8.5 7.0 6.9 6.0 7.7 8.1 8.1 7.1 5.2 5.0 2.9 2.4 3.7 4.3 6.4 8.2 6.7 7.3 5.8 7.1 4.5 1.6 2.8 6.7 6.5 8.5 9.8 8.0 8.9 6.5 7.0 8.2 8.3 9.7 10.7
9.5 6.7 4.1 3.5 2.6 1.7 0.9 0.8 1.1 2.3 8.2 10.0 8.5 8.9 6.8 6.0 4.8 3.1 7.1 9.9 10.7 7.7 4.5 8.5 10.1 10.9 10.7 10.7 10.8 10.3 9.5 11.0 10.4 9.8 14.5 13.4
5.5 6.6 6.6 8.8 6.9 2.8 1.6 1.4 1.4 1.3 7.2 10.8 10.7 9.8 4.4 2.1 2.1 1.2 2.6 9.5 11.2 10.2 9.2 8.1 9.1 8.3 6.2 4.0 2.3 4.7 10.3 8.2 7.0 4.1 7.8 7.9
5.6 5.1 5.6 11.4 9.3 5.3 5.1 4.0 1.7 1.3 1.7 8.4 8.8 8.1 8.5 6.6 4.4 2.5 1.5 5.3 7.9 6.0 7.8 6.2 6.6 5.1 3.4 3.7 2.7 5.3 6.2 4.9 5.2 8.2 3.3 3.5
5.1 5.8 5.9 7.8 7.4 7.4 7.2 5.9 4.0 2.4 2.8 7.8 7.7 5.8 7.1 8.5 7.8 5.7 3.3 3.9 5.5 6.4 5.9 6.0 6.0 5.7 5.4 4.7 3.7 4.4 4.5 4.2 4.8 4.0 3.5 4.6
4.7 4.9 5.1 6.1 5.1 4.9 5.4 4.9 4.6 4.2 5.2 6.5 5.7 6.1 5.5 5.4 5.9 5.5 4.9 4.5 4.7 5.3 6.0 5.9 5.9 5.4 4.3 4.2 4.5 4.6 4.7 4.1 4.8 5.0 5.1 5.7
4.0 4.2 4.1 3.8 4.5 4.0 3.8 3.8 3.6 3.4 4.5 4.6 3.6 3.7 4.0 3.9 3.8 3.4 3.0 2.6 2.8 3.2 3.4 4.3 4.4 4.4 3.5 2.8 2.6 3.4 3.8 4.2 4.4 4.3 4.7 4.7
2.5 2.3 2.8 3.0 3.2 3.3 3.0 2.4 2.2 2.5 2.5 2.5 2.3 2.2 2.1 2.2 2.4 2.2 1.9 1.8 1.9 2.1 2.4 2.4 2.7 3.0 2.6 2.4 2.2 1.9 2.1 2.2 2.6 3.1 3.2 3.0
1.9 1.9 2.2 2.7 2.6 2.4 2.3 2.2 2.1 2.0 2.3 2.4 2.2 1.7 1.5 1.3 1.4 1.0 1.0 1.1 1.1 1.0 0.9 0.9 1.3 1.4 1.0 0.9 0.8 1.0 1.0 1.1 1.2 1.6 2.3 2.1
1.7 1.6 1.7 1.7 2.2 2.1 1.8 1.5 1.4 1.3 1.3 1.3 1.3 1.2 1.1 1.0 0.8 0.6 0.4 0.4 0.4 0.4 0.5 0.6 0.6 0.7 0.6 0.5 0.6 0.6 0.9 1.1 1.3 1.8 2.1 1.9

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -3.8 | -3.9 | -4.2 | -4.3 | -4.5 | -4.4 | -4.4 | -4.2 | -4.3 | -4.2 | -3.6 | -3.7 | -3.3 | -3.1 | -2.9 | -3.5 | -4.4 | -4.6 | -4.7 | -4.6 | -4.8 | -5.2 | -5.3 | -5.4 | -4.6 | -4.0 | -3.9 | -3.8 | -3.5 | -3.3 | -3.1 | -3.0 | -3.3 | -3.4 | -3.4 | -3.6 |
| -3.3 | -2.8 | -2.7 | -3.0 | -3.4 | -4.0 | -4.7 | -4.7 | -4.9 | -4.7 | -3.4 | -2.6 | -3.0 | -4.9 | -4.3 | -2.5 | -3.8 | -4.3 | -4.7 | -3.7 | -3.7 | -4.1 | -4.3 | -4.0 | -3.7 | -3.4 | -3.8 | -4.3 | -3.7 | -3.0 | -2.6 | -2.5 | -2.8 | -2.7 | -3.4 | -3.6 |
| -2.4 | -2.7 | -3.8 | -3.6 | -3.3 | -3.2 | -3.6 | -3.3 | -3.6 | -3.4 | -3.8 | -4.0 | -6.8 | -8.1 | -6.5 | -5.2 | -4.6 | -5.2 | -5.2 | -4.6 | -3.6 | -4.1 | -4.4 | -3.9 | -4.2 | -4.5 | -4.7 | -4.0 | -3.1 | -2.5 | -1.9 | -1.4 | -2.1 | -3.0 | -3.5 | -3.4 |
| -3.6 | -4.6 | -5.2 | -5.4 | -6.4 | -6.5 | -5.1 | -3.3 | -2.9 | -2.9 | -3.4 | -4.3 | -6.1 | -6.7 | -6.3 | -6.1 | -4.3 | -4.0 | -3.9 | -3.7 | -2.5 | -2.6 | -2.8 | -2.8 | -3.1 | -2.9 | -3.4 | -4.0 | -2.9 | -1.2 | -1.0 | -1.8 | -4.2 | -5.9 | -4.0 | -3.7 |
| -4.1 | -3.7 | -5.0 | -6.5 | -7.6 | -6.9 | -6.1 | -4.3 | -2.6 | -3.4 | -2.8 | -4.6 | -6.1 | -7.0 | -6.3 | -5.3 | -2.6 | -2.8 | -3.6 | -4.4 | -4.2 | -3.9 | -3.1 | -1.4 | -3.1 | -3.8 | -1.8 | -0.1 | 0.7 | 0.0 | -0.3 | -1.9 | -3.9 | -4.9 | -4.5 | -3.8 |
| -2.4 | -3.6 | -5.2 | -7.2 | -7.1 | -2.6 | -1.0 | -1.0 | -0.3 | -1.2 | -2.5 | -3.9 | -5.3 | -7.9 | -4.5 | -2.1 | -1.1 | -0.7 | -2.5 | -1.6 | -2.4 | -2.4 | -2.2 | -3.0 | -4.0 | -3.7 | -2.1 | -2.2 | -1.5 | -0.2 | -1.2 | -2.6 | -2.3 | -1.9 | -1.0 | -1.3 |
| 1.3 | 0.6 | -0.1 | -0.9 | -1.4 | 0.5 | 0.1 | -2.2 | 1.5 | -1.4 | -0.6 | -0.7 | -0.8 | -0.4 | 0.8 | 0.9 | 0.9 | 0.4 | -1.9 | -1.1 | 0.3 | -0.2 | -0.1 | 0.1 | 0.4 | 1.5 | 1.7 | 0.6 | 0.7 | 1.2 | 1.1 | 1.0 | 1.0 | 0.9 | 0.9 | 1.3 |
| -0.5 | 0.4 | 0.8 | 1.2 | 1.2 | -0.3 | -2.3 | -2.3 | 0.2 | 0.8 | 1.5 | 2.0 | 1.8 | 1.7 | 1.2 | 0.7 | -0.1 | -2.1 | -1.1 | 0.0 | 1.5 | 1.1 | 1.2 | 1.5 | 1.0 | 0.1 | -0.4 | -0.1 | 0.8 | 1.0 | -0.2 | -0.2 | -0.4 | -1.1 | -1.2 | -1.1 |
| -6.8 | -4.8 | -2.8 | -2.2 | -1.3 | -2.0 | -2.0 | -2.5 | -1.7 | -0.6 | 0.2 | 1.1 | 0.9 | 1.0 | 0.3 | -1.3 | -2.8 | -2.1 | -3.0 | -2.1 | -2.7 | -0.5 | 1.3 | 0.8 | -1.0 | -1.9 | -4.6 | -6.6 | -3.8 | -5.4 | -2.6 | -3.0 | -5.5 | -5.5 | -7.0 | -8.7 |
| -6.8 | -2.5 | -0.2 | 0.0 | 0.7 | 1.4 | 1.7 | 1.6 | 1.0 | 1.0 | -2.5 | -5.3 | -5.6 | -6.0 | -1.9 | -1.1 | -0.2 | 0.7 | -1.6 | -6.5 | -9.1 | -3.2 | 0.1 | -2.4 | -4.4 | -6.6 | -6.2 | -6.0 | -7.4 | -8.8 | -6.7 | -9.0 | -9.4 | -7.3 | -14.7 | -13.6 |
| -1.5 | -1.7 | -1.8 | -3.3 | -1.8 | 0.8 | 1.3 | 1.5 | 1.5 | 1.5 | -2.0 | -9.2 | -10.3 | -8.2 | -0.6 | 1.2 | 1.1 | 1.4 | 1.0 | -7.0 | -8.4 | -6.4 | -5.4 | -3.1 | -3.3 | -3.5 | -1.3 | -0.2 | 0.9 | -0.5 | -6.8 | -4.8 | -2.4 | -0.2 | -1.6 | -4.4 |
| -1.7 | -1.1 | -1.2 | -7.3 | -5.4 | -0.8 | -0.4 | 0.2 | 1.5 | 1.6 | 1.6 | -2.0 | -3.0 | -4.1 | -3.9 | -1.7 | 0.2 | 0.8 | 1.6 | -0.1 | -4.0 | -1.4 | -2.6 | -1.9 | -1.9 | -0.7 | 0.4 | 0.9 | 1.0 | -0.6 | -1.7 | -1.0 | -1.5 | 0.2 | 0.5 | 0.1 |
| -0.9 | -1.2 | -1.2 | -3.6 | -3.4 | -3.0 | -3.1 | -1.8 | -0.1 | 1.0 | 1.1 | -1.7 | -2.4 | -1.1 | -2.3 | -4.4 | -3.3 | -1.3 | 0.3 | 0.2 | -0.8 | -1.6 | -1.0 | -1.1 | -1.0 | -1.3 | -1.1 | -0.6 | 0.0 | -0.1 | -0.5 | 0.1 | -0.7 | -0.1 | 0.1 | -0.6 |
| -1.7 | -1.8 | -2.0 | -2.8 | -2.2 | -2.0 | -2.2 | -2.1 | -1.6 | -1.3 | -2.5 | -3.5 | -2.4 | -3.2 | -2.8 | -2.6 | -2.9 | -2.6 | -2.1 | -1.9 | -2.4 | -2.7 | -3.2 | -3.3 | -3.0 | -2.7 | -2.1 | -1.7 | -2.1 | -2.1 | -1.6 | -1.3 | -1.5 | -1.9 | -2.2 | -3.0 |
| -2.7 | -3.0 | -2.7 | -2.5 | -3.1 | -2.4 | -2.5 | -2.5 | -2.6 | -2.7 | -4.2 | -3.8 | -2.6 | -3.0 | -3.4 | -3.2 | -3.2 | -2.8 | -2.8 | -2.8 | -3.0 | -3.2 | -3.3 | -3.7 | -3.7 | -3.8 | -3.1 | -2.7 | -2.3 | -2.9 | -3.1 | -3.1 | -3.3 | -3.2 | -3.2 | -3.0 |
| -2.5 | -2.6 | -2.8 | -3.0 | -2.8 | -2.7 | -2.9 | -2.8 | -2.9 | -3.3 | -3.3 | -3.0 | -2.6 | -2.2 | -2.0 | -1.9 | -2.3 | -2.6 | -3.0 | -3.1 | -3.4 | -2.8 | -2.8 | -3.4 | -3.3 | -3.0 | -2.8 | -2.6 | -2.9 | -2.4 | -2.5 | -2.6 | -2.9 | -3.6 | -3.1 | -2.6 |
| -3.0 | -2.7 | -2.5 | -2.9 | -2.9 | -2.8 | -2.9 | -3.1 | -3.5 | -3.5 | -3.8 | -3.3 | -2.7 | -2.5 | -2.0 | -2.0 | -2.2 | -1.8 | -1.7 | -2.0 | -1.6 | -1.3 | -1.6 | -1.8 | -1.3 | -1.3 | -1.3 | -1.7 | -1.9 | -2.1 | -2.1 | -1.8 | -1.6 | -2.1 | -3.1 | -3.0 |
| -2.6 | -2.3 | -1.9 | -2.1 | -2.3 | -2.0 | -2.3 | -2.9 | -3.0 | -2.4 | -2.7 | -2.5 | -2.5 | -2.4 | -2.5 | -2.3 | -1.8 | -1.6 | -1.3 | -1.0 | -0.7 | -0.7 | -1.0 | -1.5 | -1.5 | -1.5 | -1.5 | -1.3 | -1.4 | -1.4 | -1.6 | -1.7 | -2.0 | -2.7 | -3.4 | -3.3 |

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.5 | 2.7 | 2.9 | 3.0 | 3.2 | 2.8 | 2.6 | 2.6 | 3.3 | 3.9 | 4.4 | 3.5 | 2.8 | 2.6 | 3.4 | 3.2 | 3.0 | 2.7 | 3.1 | 3.3 | 3.2 | 3.7 | 4.2 | 4.1 | 3.6 | 3.2 | 2.7 | 2.7 | 2.6 | 2.6 | 2.4 | 2.1 | 2.3 | 2.4 | 2.2 | 2.3 |
| 3.1 | 2.8 | 2.9 | 3.2 | 3.6 | 3.7 | 3.6 | 3.1 | 3.4 | 4.5 | 4.1 | 3.9 | 5.1 | 5.0 | 4.6 | 5.2 | 4.0 | 4.6 | 5.2 | 4.8 | 4.3 | 4.6 | 4.7 | 4.6 | 3.9 | 3.2 | 3.1 | 4.0 | 3.6 | 2.6 | 2.3 | 2.1 | 2.3 | 3.0 | 3.7 | 3.4 |
| 3.7 | 4.9 | 6.7 | 6.3 | 5.8 | 4.9 | 3.9 | 3.4 | 3.4 | 3.9 | 4.8 | 6.0 | 7.9 | 9.4 | 7.8 | 7.1 | 7.0 | 7.7 | 7.4 | 7.3 | 5.3 | 5.4 | 5.1 | 4.4 | 4.6 | 4.7 | 4.3 | 4.3 | 3.2 | 2.2 | 1.9 | 2.0 | 2.9 | 4.0 | 5.7 | 4.3 |
| 4.5 | 6.4 | 6.4 | 6.8 | 8.2 | 8.8 | 7.7 | 5.2 | 3.7 | 3.6 | 3.6 | 6.2 | 7.7 | 8.4 | 8.9 | 9.1 | 7.3 | 7.3 | 6.8 | 6.3 | 5.0 | 4.6 | 4.8 | 4.5 | 5.0 | 4.8 | 5.2 | 5.6 | 4.3 | 3.8 | 2.4 | 3.3 | 4.9 | 6.5 | 4.9 | 4.0 |
| 6.4 | 6.3 | 7.2 | 8.8 | 9.8 | 9.3 | 8.1 | 7.7 | 5.1 | 4.7 | 4.4 | 7.0 | 9.1 | 10.5 | 10.0 | 9.3 | 6.7 | 6.8 | 7.2 | 7.1 | 7.1 | 7.5 | 6.6 | 4.7 | 6.5 | 6.9 | 5.6 | 5.4 | 3.8 | 3.2 | 3.3 | 4.1 | 5.4 | 5.8 | 6.0 | 5.6 |
| 6.0 | 6.9 | 7.9 | 10.0 | 10.1 | 7.1 | 5.1 | 5.2 | 3.7 | 4.7 | 6.2 | 7.5 | 9.9 | 11.7 | 9.3 | 6.7 | 5.3 | 4.5 | 6.5 | 5.6 | 6.6 | 8.4 | 5.9 | 7.5 | 7.9 | 8.6 | 8.4 | 9.2 | 7.3 | 5.3 | 4.8 | 5.6 | 6.0 | 4.8 | 4.6 | 4.9 |
| 2.3 | 3.2 | 5.2 | 6.8 | 7.3 | 4.3 | 4.7 | 5.8 | 5.1 | 6.3 | 5.2 | 6.0 | 6.4 | 6.2 | 3.9 | 3.0 | 3.8 | 5.9 | 8.0 | 6.8 | 5.4 | 4.9 | 5.0 | 4.2 | 4.0 | 3.6 | 4.7 | 4.9 | 4.0 | 3.3 | 3.0 | 2.3 | 2.0 | 2.6 | 3.8 | 2.4 |
| 6.0 | 4.4 | 4.2 | 2.8 | 2.9 | 5.6 | 6.8 | 6.7 | 4.1 | 3.4 | 2.2 | 2.0 | 1.5 | 1.2 | 2.0 | 3.5 | 5.7 | 8.9 | 6.0 | 5.2 | 3.9 | 2.8 | 2.6 | 1.5 | 3.7 | 5.5 | 6.0 | 4.9 | 3.0 | 3.0 | 5.1 | 5.4 | 5.1 | 6.4 | 6.4 | 6.6 |
| 11.0 | 10.1 | 8.8 | 8.3 | 7.0 | 8.0 | 8.8 | 9.0 | 8.2 | 6.2 | 6.2 | 3.9 | 2.9 | 3.9 | 4.2 | 6.5 | 7.9 | 6.9 | 8.6 | 6.8 | 8.5 | 4.8 | 1.9 | 3.3 | 6.9 | 7.3 | 9.6 | 10.9 | 8.8 | 9.9 | 7.6 | 8.0 | 9.3 | 9.8 | 11.3 | 12.3 |
| 10.8 | 8.1 | 4.9 | 4.0 | 3.1 | 2.0 | 1.1 | 1.2 | 1.6 | 2.6 | 9.8 | 11.9 | 9.6 | 9.4 | 7.1 | 6.4 | 4.8 | 3.2 | 7.8 | 11.4 | 12.2 | 8.7 | 5.0 | 9.3 | 10.9 | 11.6 | 11.6 | 12.1 | 12.0 | 11.5 | 10.7 | 11.8 | 11.3 | 10.8 | 15.6 | 15.1 |
| 6.7 | 7.4 | 7.0 | 9.4 | 7.4 | 3.4 | 2.1 | 1.8 | 1.9 | 1.8 | 8.1 | 12.6 | 12.3 | 10.6 | 5.6 | 2.7 | 2.6 | 1.9 | 3.3 | 10.6 | 13.3 | 12.2 | 10.5 | 9.1 | 10.6 | 9.7 | 7.4 | 5.1 | 3.1 | 5.9 | 11.5 | 9.3 | 7.7 | 5.2 | 8.1 | 9.5 |
| 5.8 | 5.4 | 6.0 | 11.3 | 9.6 | 5.8 | 5.3 | 4.5 | 2.4 | 1.8 | 2.4 | 9.6 | 11.0 | 8.7 | 8.7 | 6.7 | 4.5 | 3.0 | 2.5 | 5.0 | 8.0 | 7.1 | 9.2 | 7.0 | 7.2 | 5.8 | 4.4 | 4.0 | 3.2 | 5.6 | 5.5 | 4.4 | 4.6 | 8.8 | 3.9 | 4.6 |
| 5.4 | 6.1 | 6.4 | 8.4 | 7.4 | 7.5 | 7.5 | 6.3 | 4.2 | 2.4 | 2.9 | 8.9 | 8.7 | 6.3 | 7.4 | 9.1 | 8.2 | 6.5 | 4.0 | 4.3 | 6.0 | 7.2 | 6.2 | 6.4 | 6.2 | 5.9 | 5.7 | 5.0 | 4.3 | 4.6 | 4.6 | 3.9 | 4.2 | 4.3 | 3.9 | 5.2 |
| 5.2 | 5.7 | 5.6 | 6.4 | 5.6 | 5.3 | 5.9 | 5.3 | 5.1 | 4.6 | 6.2 | 7.5 | 6.5 | 6.8 | 6.3 | 5.9 | 6.8 | 6.3 | 5.8 | 5.1 | 5.5 | 6.2 | 6.6 | 6.6 | 6.6 | 6.2 | 5.1 | 4.9 | 5.0 | 5.2 | 5.3 | 4.8 | 5.3 | 5.4 | 5.2 | 6.4 |
| 4.7 | 4.8 | 4.6 | 4.5 | 5.2 | 4.4 | 4.5 | 4.5 | 4.4 | 4.3 | 5.6 | 5.7 | 4.5 | 4.8 | 5.3 | 5.1 | 4.9 | 4.5 | 3.9 | 3.5 | 3.9 | 4.2 | 4.8 | 5.3 | 5.4 | 5.6 | 4.4 | 3.5 | 3.3 | 4.2 | 4.6 | 5.1 | 5.0 | 4.9 | 5.2 | 5.1 |
| 3.3 | 3.1 | 3.5 | 3.8 | 3.9 | 4.0 | 3.9 | 3.1 | 3.1 | 3.6 | 3.4 | 3.7 | 3.4 | 3.4 | 3.3 | 3.6 | 3.5 | 3.1 | 2.9 | 2.8 | 3.0 | 3.1 | 3.5 | 3.6 | 3.9 | 4.1 | 3.4 | 3.2 | 3.1 | 2.9 | 2.9 | 3.1 | 3.5 | 4.0 | 4.1 | 3.8 |
| 3.0 | 3.2 | 3.4 | 4.0 | 4.1 | 3.9 | 3.7 | 3.3 | 3.3 | 3.2 | 3.7 | 4.0 | 3.4 | 3.1 | 2.9 | 2.7 | 2.7 | 2.2 | 2.2 | 2.2 | 2.1 | 2.0 | 2.0 | 2.0 | 2.5 | 2.5 | 2.0 | 1.9 | 1.7 | 1.9 | 2.0 | 2.0 | 2.1 | 2.8 | 3.7 | 3.1 |
| 3.2 | 3.1 | 3.2 | 3.1 | 3.7 | 3.7 | 3.3 | 2.8 | 2.8 | 2.6 | 2.6 | 2.5 | 2.2 | 2.3 | 2.4 | 2.2 | 2.0 | 1.5 | 1.2 | 1.1 | 1.0 | 1.0 | 1.1 | 1.5 | 1.5 | 1.6 | 1.5 | 1.3 | 1.3 | 1.3 | 1.6 | 1.9 | 2.2 | 3.2 | 3.5 | 3.3 |

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

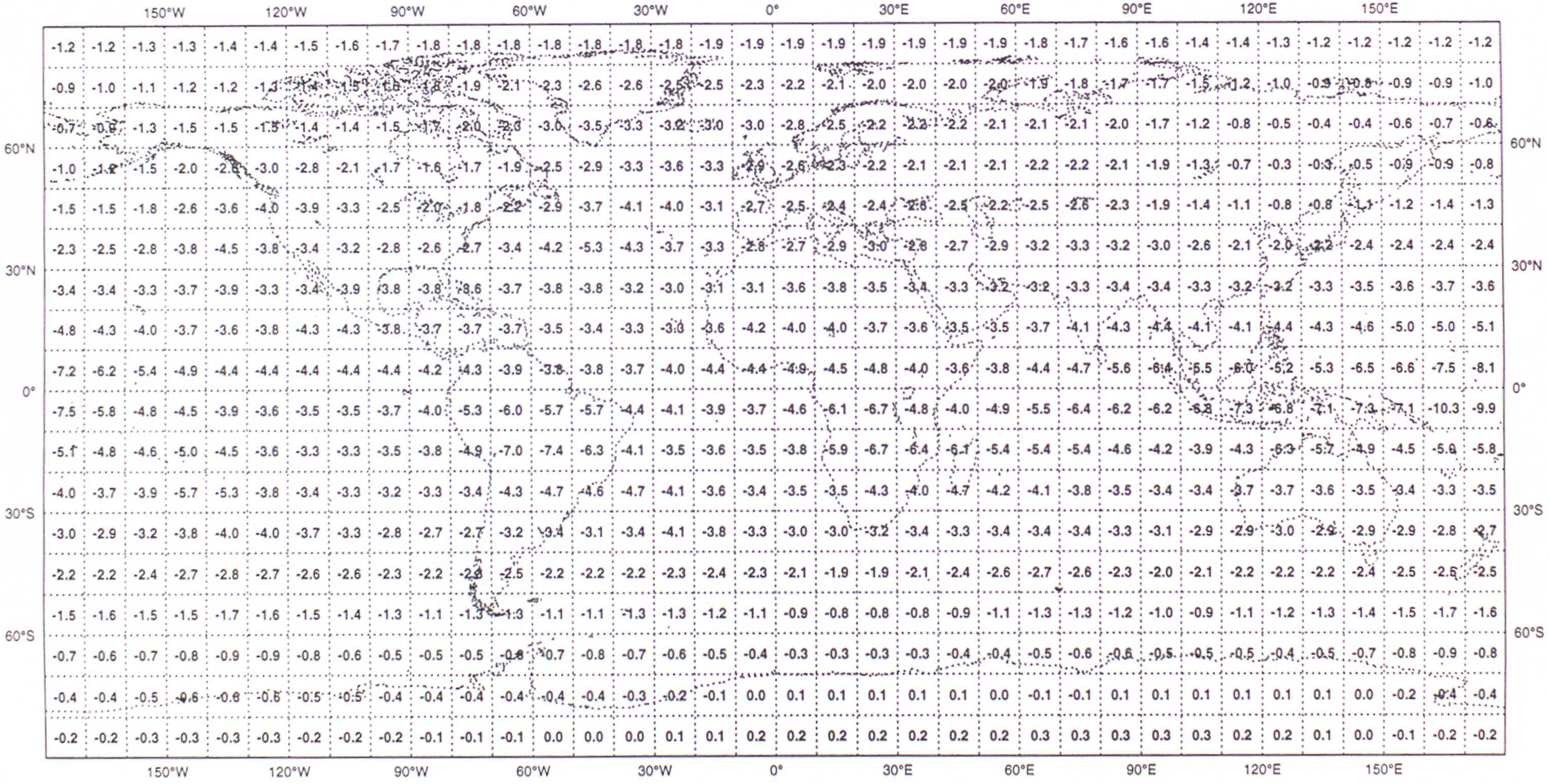

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-1.2 -1.2 -1.3 -1.3 -1.4 -1.4 -1.5 -1.6 -1.7 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.8 -1.9 -1.9 -1.9 -1.9 -1.9 -1.9 -1.9 -1.9 -1.8 -1.7 -1.6 -1.6 -1.4 -1.4 -1.3 -1.2 -1.2 -1.2 -1.2 -1.2
-0.9 -1.0 -1.1 -1.2 -1.2 -1.3 -1.4 -1.5 -1.6 -1.8 -1.9 -2.1 -2.3 -2.6 -2.6 -2.5 -2.5 -2.3 -2.2 -2.1 -2.0 -2.0 -2.0 -2.0 -1.9 -1.8 -1.7 -1.7 -1.5 -1.2 -1.0 -0.9 -0.8 -0.9 -0.9 -1.0
-0.7 -0.8 -1.3 -1.5 -1.5 -1.5 -1.4 -1.4 -1.5 -1.7 -2.0 -2.3 -3.0 -3.5 -3.3 -3.2 -3.0 -3.0 -2.8 -2.5 -2.2 -2.2 -2.2 -2.1 -2.1 -2.1 -2.0 -1.7 -1.2 -0.8 -0.5 -0.4 -0.4 -0.6 -0.7 -0.6
-1.0 -1.2 -1.5 -2.0 -2.8 -3.0 -2.8 -2.1 -1.7 -1.6 -1.7 -1.9 -2.5 -2.9 -3.3 -3.6 -3.3 -2.9 -2.6 -2.3 -2.2 -2.1 -2.1 -2.1 -2.2 -2.2 -2.1 -1.9 -1.3 -0.7 -0.3 -0.3 -0.5 -0.9 -0.9 -0.8
-1.5 -1.5 -1.8 -2.6 -3.6 -4.0 -3.9 -3.3 -2.5 -2.0 -1.8 -2.2 -2.9 -3.7 -4.1 -4.0 -3.1 -2.7 -2.5 -2.4 -2.4 -2.6 -2.5 -2.2 -2.5 -2.6 -2.3 -1.9 -1.4 -1.1 -0.8 -0.8 -1.1 -1.2 -1.4 -1.3
-2.3 -2.5 -2.8 -3.8 -4.5 -3.8 -3.4 -3.2 -2.8 -2.6 -2.7 -3.4 -4.2 -5.3 -4.3 -3.7 -3.3 -2.8 -2.7 -2.9 -3.0 -2.8 -2.7 -2.9 -3.2 -3.3 -3.2 -3.0 -2.6 -2.1 -2.0 -2.2 -2.4 -2.4 -2.4 -2.4
-3.4 -3.4 -3.3 -3.7 -3.9 -3.3 -3.4 -3.9 -3.8 -3.8 -3.6 -3.7 -3.8 -3.8 -3.2 -3.0 -3.1 -3.1 -3.6 -3.8 -3.5 -3.4 -3.3 -3.2 -3.2 -3.3 -3.4 -3.4 -3.3 -3.2 -3.2 -3.3 -3.5 -3.6 -3.7 -3.6
-4.8 -4.3 -4.0 -3.7 -3.6 -3.8 -4.3 -4.3 -3.8 -3.7 -3.7 -3.7 -3.5 -3.4 -3.3 -3.0 -3.6 -4.2 -4.0 -4.0 -3.7 -3.6 -3.5 -3.5 -3.7 -4.1 -4.3 -4.4 -4.1 -4.1 -4.4 -4.3 -4.6 -5.0 -5.0 -5.1
-7.2 -6.2 -5.4 -4.9 -4.4 -4.4 -4.4 -4.4 -4.4 -4.2 -4.3 -3.9 -3.8 -3.8 -3.7 -4.0 -4.4 -4.4 -4.9 -4.5 -4.8 -4.0 -3.6 -3.8 -4.4 -4.7 -5.6 -6.4 -5.5 -6.0 -5.2 -5.3 -6.5 -6.6 -7.5 -8.1
-7.5 -5.8 -4.8 -4.5 -3.9 -3.6 -3.5 -3.5 -3.7 -4.0 -5.3 -6.0 -5.7 -5.7 -4.4 -4.1 -3.9 -3.7 -4.6 -6.1 -6.7 -4.8 -4.0 -4.9 -5.5 -6.4 -6.2 -6.2 -6.8 -7.3 -6.8 -7.1 -7.3 -7.1 -10.3 -9.9
-5.1 -4.8 -4.6 -5.0 -4.5 -3.6 -3.3 -3.3 -3.5 -3.8 -4.9 -7.0 -7.4 -6.3 -4.1 -3.5 -3.6 -3.5 -3.8 -5.9 -6.7 -6.4 -6.1 -5.4 -5.4 -5.4 -4.6 -4.2 -3.9 -4.3 -6.3 -5.7 -4.9 -4.5 -5.0 -5.8
-4.0 -3.7 -3.9 -5.7 -5.3 -3.8 -3.4 -3.3 -3.2 -3.3 -3.4 -4.3 -4.7 -4.6 -4.7 -4.1 -3.6 -3.4 -3.5 -3.5 -4.3 -4.0 -4.7 -4.2 -4.1 -3.8 -3.5 -3.4 -3.4 -3.7 -3.7 -3.6 -3.5 -3.4 -3.3 -3.5
-3.0 -2.9 -3.2 -3.8 -4.0 -4.0 -3.7 -3.3 -2.8 -2.7 -2.7 -3.2 -3.4 -3.1 -3.4 -4.1 -3.8 -3.3 -3.0 -3.0 -3.2 -3.4 -3.3 -3.4 -3.4 -3.4 -3.3 -3.1 -2.9 -2.9 -3.0 -2.9 -2.9 -2.9 -2.8 -2.7
-2.2 -2.2 -2.4 -2.7 -2.8 -2.7 -2.6 -2.6 -2.3 -2.2 -2.3 -2.5 -2.2 -2.2 -2.2 -2.3 -2.4 -2.3 -2.1 -1.9 -1.9 -2.1 -2.4 -2.6 -2.7 -2.6 -2.3 -2.0 -2.1 -2.2 -2.2 -2.2 -2.4 -2.5 -2.5 -2.5
-1.5 -1.6 -1.5 -1.5 -1.7 -1.6 -1.5 -1.4 -1.3 -1.1 -1.3 -1.3 -1.1 -1.1 -1.3 -1.3 -1.2 -1.1 -0.9 -0.8 -0.8 -0.8 -0.9 -1.1 -1.3 -1.3 -1.2 -1.0 -0.9 -1.1 -1.2 -1.3 -1.4 -1.5 -1.7 -1.6
-0.7 -0.6 -0.7 -0.8 -0.9 -0.9 -0.8 -0.6 -0.5 -0.5 -0.5 -0.8 -0.7 -0.8 -0.7 -0.6 -0.5 -0.4 -0.3 -0.3 -0.3 -0.3 -0.4 -0.4 -0.5 -0.6 -0.6 -0.5 -0.5 -0.5 -0.4 -0.5 -0.7 -0.8 -0.9 -0.8
-0.4 -0.4 -0.5 -0.6 -0.6 -0.6 -0.5 -0.5 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.3 -0.2 -0.1 0.0 0.1 0.1 0.1 0.1 0.1 0.0 -0.1 -0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.0 -0.2 -0.4 -0.4
-0.2 -0.2 -0.3 -0.3 -0.3 -0.3 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.1 0.0 -0.1 -0.2 -0.2

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations

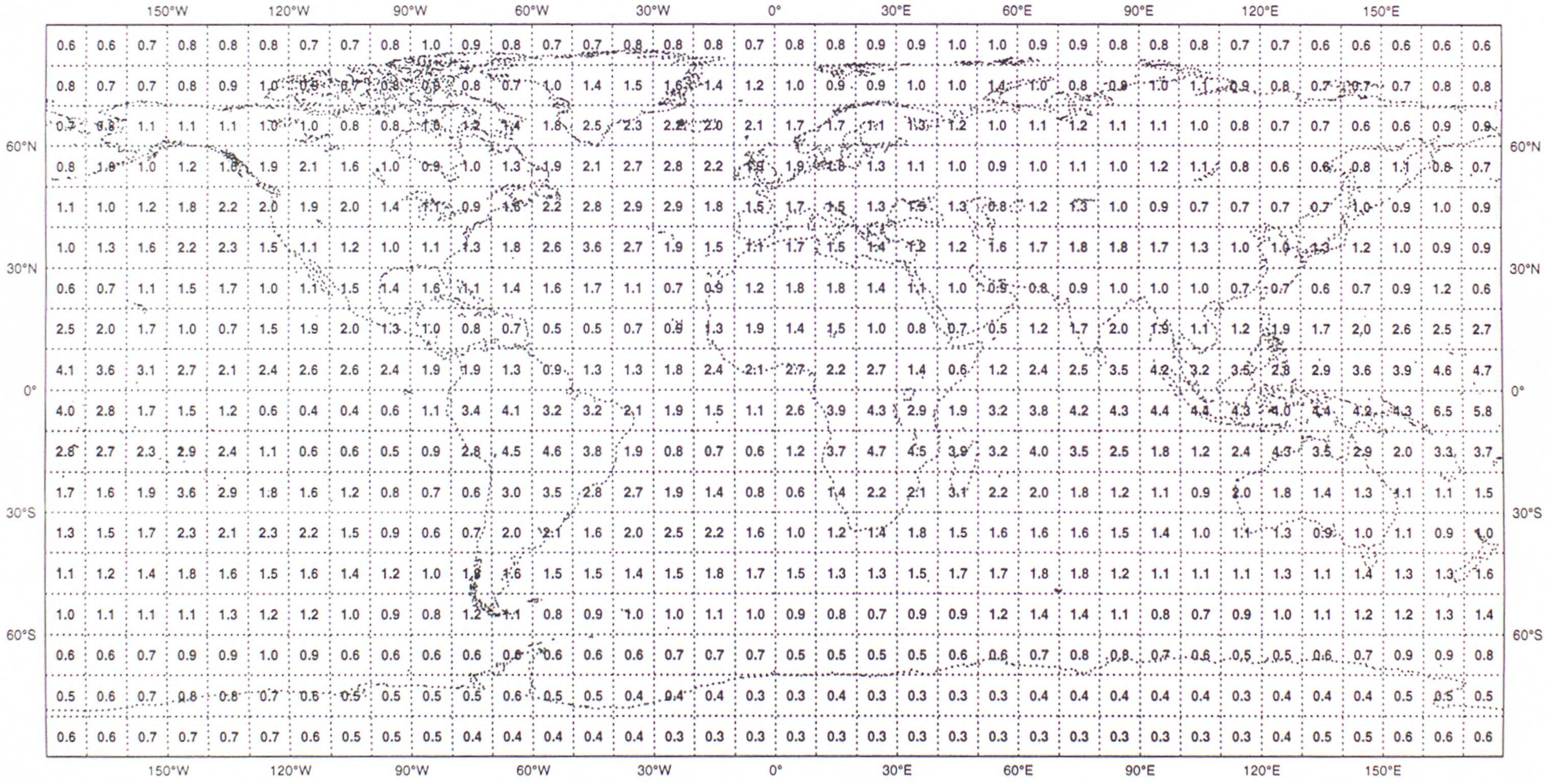
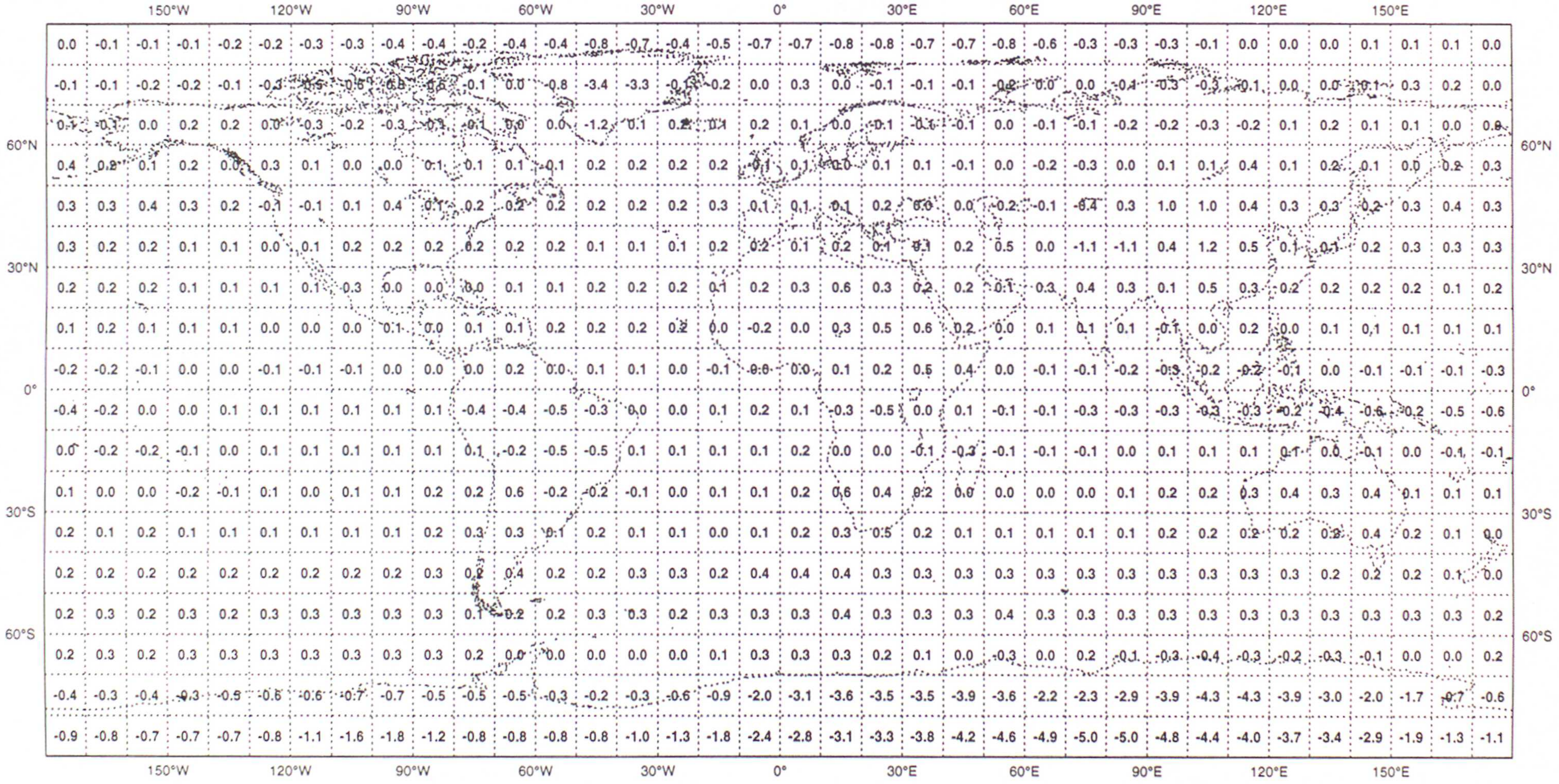

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.6 0.6 0.7 0.8 0.8 0.8 0.7 0.7 0.8 1.0 0.9 0.8 0.7 0.7 0.8 0.8 0.8 0.7 0.8 0.8 0.9 0.9 1.0 1.0 0.9 0.9 0.8 0.8 0.8 0.7 0.7 0.6 0.6 0.6 0.6 0.6
0.8 0.7 0.7 0.8 0.9 1.0 0.9 0.7 0.8 0.9 0.8 0.7 1.0 1.4 1.5 1.6 1.4 1.2 1.0 0.9 0.9 1.0 1.0 1.4 1.0 0.8 0.9 1.0 1.1 0.9 0.8 0.7 0.7 0.7 0.8 0.8
0.7 0.8 1.1 1.1 1.1 1.0 1.0 0.8 0.8 1.0 1.2 1.4 1.8 2.5 2.3 2.2 2.0 2.1 1.7 1.7 1.1 1.3 1.2 1.0 1.1 1.2 1.1 1.1 1.0 0.8 0.7 0.7 0.6 0.6 0.9 0.9
0.8 1.8 1.0 1.2 1.8 1.9 2.1 1.6 1.0 0.9 1.0 1.3 1.9 2.1 2.7 2.8 2.2 1.9 1.9 1.8 1.3 1.1 1.0 0.9 1.0 1.1 1.0 1.2 1.1 0.8 0.6 0.6 0.8 1.1 0.8 0.7
1.1 1.0 1.2 1.8 2.2 2.0 1.9 2.0 1.4 1.1 0.9 1.6 2.2 2.8 2.9 2.9 1.8 1.5 1.7 1.5 1.3 1.5 1.3 0.8 1.2 1.3 1.0 0.9 0.7 0.7 0.7 0.7 1.0 0.9 1.0 0.9
1.0 1.3 1.6 2.2 2.3 1.5 1.1 1.2 1.0 1.1 1.3 1.8 2.6 3.6 2.7 1.9 1.5 1.1 1.7 1.5 1.4 1.2 1.2 1.6 1.7 1.8 1.8 1.7 1.3 1.0 1.0 1.3 1.2 1.0 0.9 0.9
0.6 0.7 1.1 1.5 1.7 1.0 1.1 1.5 1.4 1.6 1.1 1.4 1.6 1.7 1.1 0.7 0.9 1.2 1.8 1.8 1.4 1.1 1.0 0.9 0.8 0.9 1.0 1.0 1.0 0.7 0.7 0.6 0.7 0.9 1.2 0.6
2.5 2.0 1.7 1.0 0.7 1.5 1.9 2.0 1.3 1.0 0.8 0.7 0.5 0.5 0.7 0.9 1.3 1.9 1.4 1.5 1.0 0.8 0.7 0.5 1.2 1.7 2.0 1.9 1.1 1.2 1.9 1.7 2.0 2.6 2.5 2.7
4.1 3.6 3.1 2.7 2.1 2.4 2.6 2.6 2.4 1.9 1.9 1.3 0.9 1.3 1.3 1.8 2.4 2.1 2.7 2.2 2.7 1.4 0.6 1.2 2.4 2.5 3.5 4.2 3.2 3.5 2.8 2.9 3.6 3.9 4.6 4.7
4.0 2.8 1.7 1.5 1.2 0.6 0.4 0.4 0.6 1.1 3.4 4.1 3.2 3.2 2.1 1.9 1.5 1.1 2.6 3.9 4.3 2.9 1.9 3.2 3.8 4.2 4.3 4.4 4.4 4.3 4.0 4.4 4.2 4.3 6.5 5.8
2.8 2.7 2.3 2.9 2.4 1.1 0.6 0.6 0.5 0.9 2.8 4.5 4.6 3.8 1.9 0.8 0.7 0.6 1.2 3.7 4.7 4.5 3.9 3.2 4.0 3.5 2.5 1.8 1.2 2.4 4.3 3.5 2.9 2.0 3.3 3.7
1.7 1.6 1.9 3.6 2.9 1.8 1.6 1.2 0.8 0.7 0.6 3.0 3.5 2.8 2.7 1.9 1.4 0.8 0.6 1.4 2.2 2.1 3.1 2.2 2.0 1.8 1.2 1.1 0.9 2.0 1.8 1.4 1.3 1.1 1.1 1.5
1.3 1.5 1.7 2.3 2.1 2.3 2.2 1.5 0.9 0.6 0.7 2.0 2.1 1.6 2.0 2.5 2.2 1.6 1.0 1.2 1.4 1.8 1.5 1.6 1.6 1.6 1.5 1.4 1.0 1.1 1.3 0.9 1.0 1.1 0.9 1.0
1.1 1.2 1.4 1.8 1.6 1.5 1.6 1.4 1.2 1.0 1.8 1.6 1.5 1.5 1.4 1.5 1.8 1.7 1.5 1.3 1.3 1.5 1.7 1.7 1.8 1.8 1.2 1.1 1.1 1.1 1.3 1.1 1.4 1.3 1.3 1.6
1.0 1.1 1.1 1.1 1.3 1.2 1.2 1.0 0.9 0.8 1.2 1.1 0.8 0.9 1.0 1.0 1.1 1.0 0.9 0.8 0.7 0.9 0.9 1.2 1.4 1.4 1.1 0.8 0.7 0.9 1.0 1.1 1.2 1.2 1.3 1.4
0.6 0.6 0.7 0.9 0.9 1.0 0.9 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.7 0.7 0.7 0.5 0.5 0.5 0.5 0.6 0.6 0.7 0.8 0.8 0.7 0.6 0.5 0.5 0.6 0.7 0.9 0.9 0.8
0.5 0.6 0.7 0.8 0.8 0.7 0.6 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.4 0.4 0.4 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.4 0.5 0.5 0.5
0.6 0.6 0.7 0.7 0.7 0.7 0.6 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.5 0.5 0.6 0.6 0.6

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.0 | -0.1 | -0.1 | -0.1 | -0.2 | -0.2 | -0.3 | -0.3 | -0.4 | -0.4 | -0.2 | -0.4 | -0.4 | -0.8 | -0.7 | -0.4 | -0.5 | -0.7 | -0.7 | -0.8 | -0.8 | -0.7 | -0.7 | -0.8 | -0.6 | -0.3 | -0.3 | -0.3 | -0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 |
| -0.1 | -0.1 | -0.2 | -0.2 | -0.1 | -0.3 | -0.5 | -0.6 | -0.8 | -0.6 | -0.1 | 0.0 | -0.8 | -3.4 | -3.3 | -0.1 | -0.2 | 0.0 | 0.3 | 0.0 | -0.1 | -0.1 | -0.1 | -0.2 | 0.0 | 0.0 | -0.4 | -0.3 | -0.3 | -0.1 | 0.0 | 0.0 | -0.1 | 0.3 | 0.2 | 0.0 |
| 0.1 | -0.1 | 0.0 | 0.2 | 0.2 | 0.0 | -0.3 | -0.2 | -0.3 | -0.1 | -0.1 | 0.0 | 0.0 | -1.2 | 0.1 | 0.2 | 0.1 | 0.2 | 0.1 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 | -0.2 | -0.2 | -0.3 | -0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.8 |
| 0.4 | 0.2 | 0.1 | 0.2 | 0.0 | 0.3 | 0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | -0.1 | 0.2 | 0.2 | 0.2 | 0.2 | -0.1 | 0.1 | 0.0 | 0.1 | 0.1 | -0.1 | 0.0 | -0.2 | -0.3 | 0.0 | 0.1 | 0.1 | 0.4 | 0.1 | 0.2 | 0.1 | 0.0 | 0.2 | 0.3 |
| 0.3 | 0.3 | 0.4 | 0.3 | 0.2 | -0.1 | -0.1 | 0.1 | 0.4 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.1 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | -0.2 | -0.1 | -0.4 | 0.3 | 1.0 | 1.0 | 0.4 | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 | 0.3 |
| 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.2 | 0.5 | 0.0 | -1.1 | -1.1 | 0.4 | 1.2 | 0.5 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 |
| 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.3 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.3 | 0.6 | 0.3 | 0.2 | 0.2 | 0.1 | 0.3 | 0.4 | 0.3 | 0.1 | 0.5 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 |
| 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.0 | -0.2 | 0.0 | 0.3 | 0.5 | 0.6 | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | -0.1 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| -0.2 | -0.2 | -0.1 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.1 | 0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.5 | 0.4 | 0.0 | -0.1 | -0.1 | -0.2 | -0.3 | -0.2 | -0.2 | -0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.3 |
| -0.4 | -0.2 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | -0.4 | -0.4 | -0.5 | -0.3 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | -0.3 | -0.5 | 0.0 | 0.1 | -0.1 | -0.1 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.4 | -0.6 | -0.2 | -0.5 | -0.6 |
| 0.0 | -0.2 | -0.2 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | -0.2 | -0.5 | -0.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | -0.1 | -0.3 | -0.1 | -0.1 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | 0.0 | -0.1 | -0.1 |
| 0.1 | 0.0 | 0.0 | -0.2 | -0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.6 | -0.2 | -0.2 | -0.1 | 0.0 | 0.1 | 0.1 | 0.2 | 0.6 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.3 | 0.4 | 0.3 | 0.4 | 0.1 | 0.1 | 0.1 |
| 0.2 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.2 | 0.3 | 0.5 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.4 | 0.2 | 0.1 | 0.0 |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.4 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 |
| 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 |
| 0.2 | 0.3 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.3 | 0.3 | 0.3 | 0.2 | 0.1 | 0.0 | -0.3 | 0.0 | 0.2 | -0.1 | -0.3 | -0.4 | -0.3 | -0.2 | -0.3 | -0.1 | 0.0 | 0.0 | 0.2 |
| -0.4 | -0.3 | -0.4 | -0.3 | -0.5 | -0.6 | -0.6 | -0.7 | -0.7 | -0.5 | -0.5 | -0.5 | -0.3 | -0.2 | -0.3 | -0.6 | -0.9 | -2.0 | -3.1 | -3.6 | -3.5 | -3.5 | -3.9 | -3.6 | -2.2 | -2.3 | -2.9 | -3.9 | -4.3 | -4.3 | -3.9 | -3.0 | -2.0 | -1.7 | -0.7 | -0.6 |
| -0.9 | -0.8 | -0.7 | -0.7 | -0.7 | -0.8 | -1.1 | -1.6 | -1.8 | -1.2 | -0.8 | -0.8 | -0.8 | -0.8 | -1.0 | -1.3 | -1.8 | -2.4 | -2.8 | -3.1 | -3.3 | -3.8 | -4.2 | -4.6 | -4.9 | -5.0 | -5.0 | -4.8 | -4.4 | -4.0 | -3.7 | -3.4 | -2.9 | -1.9 | -1.3 | -1.1 |

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

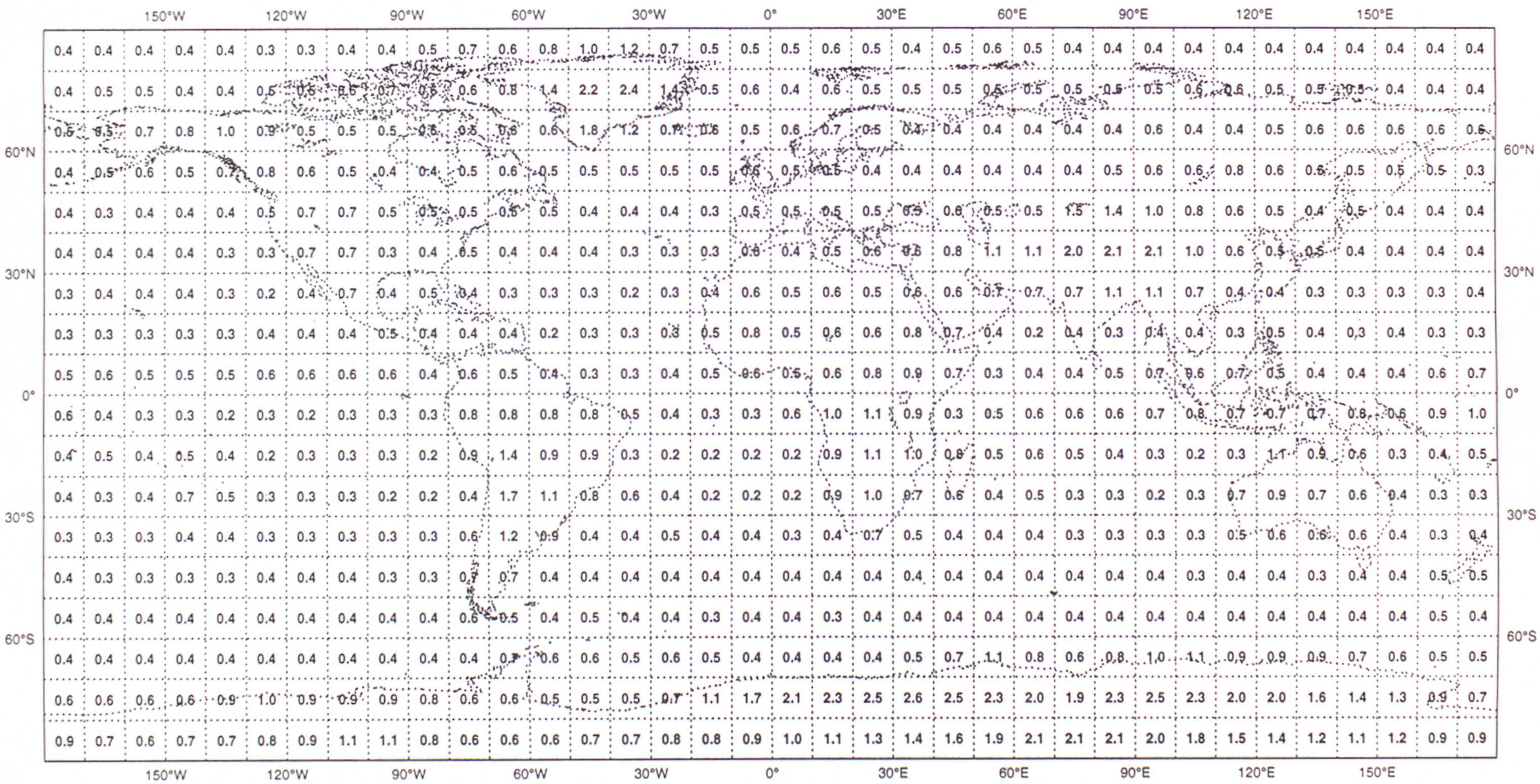
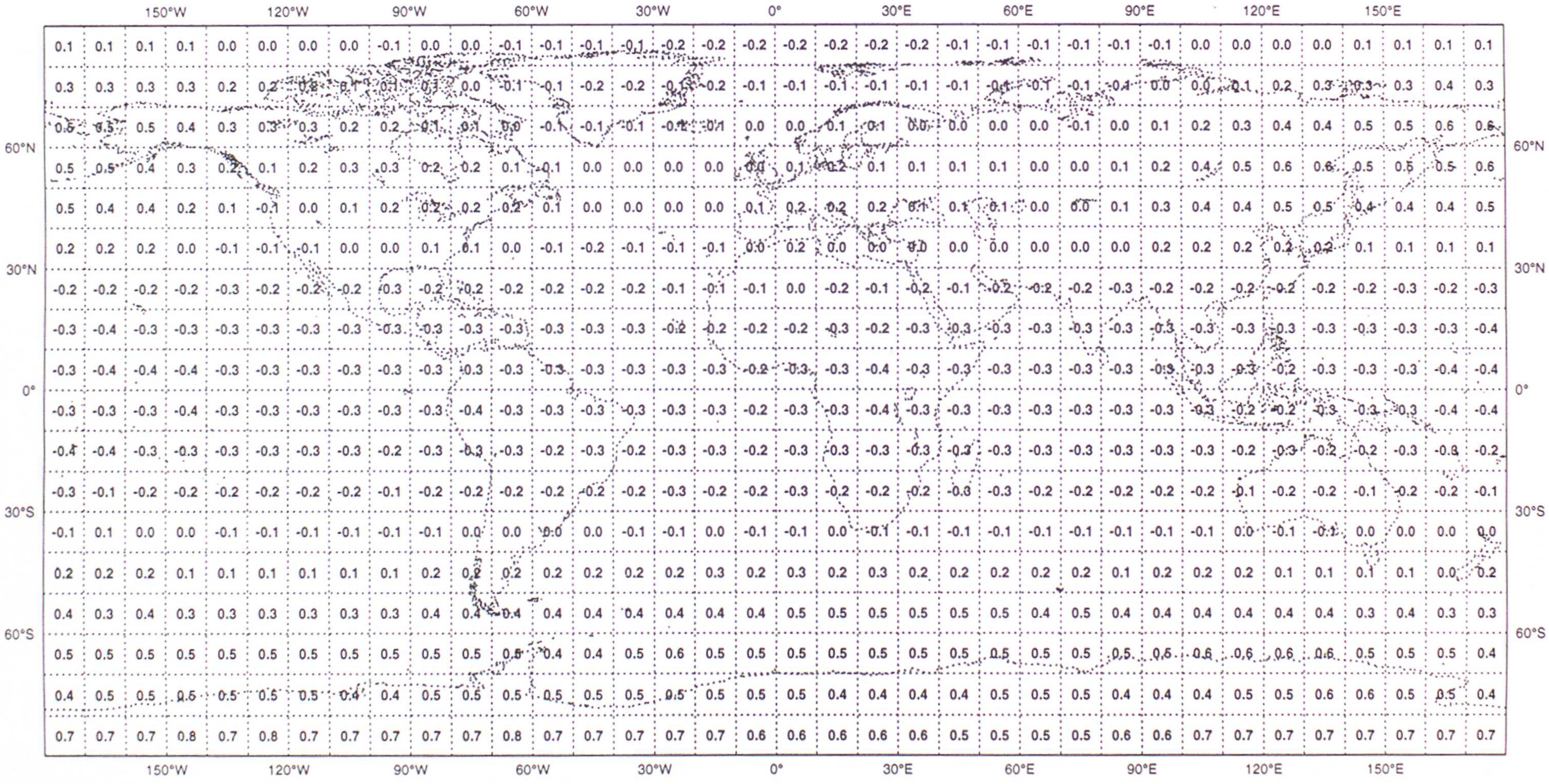
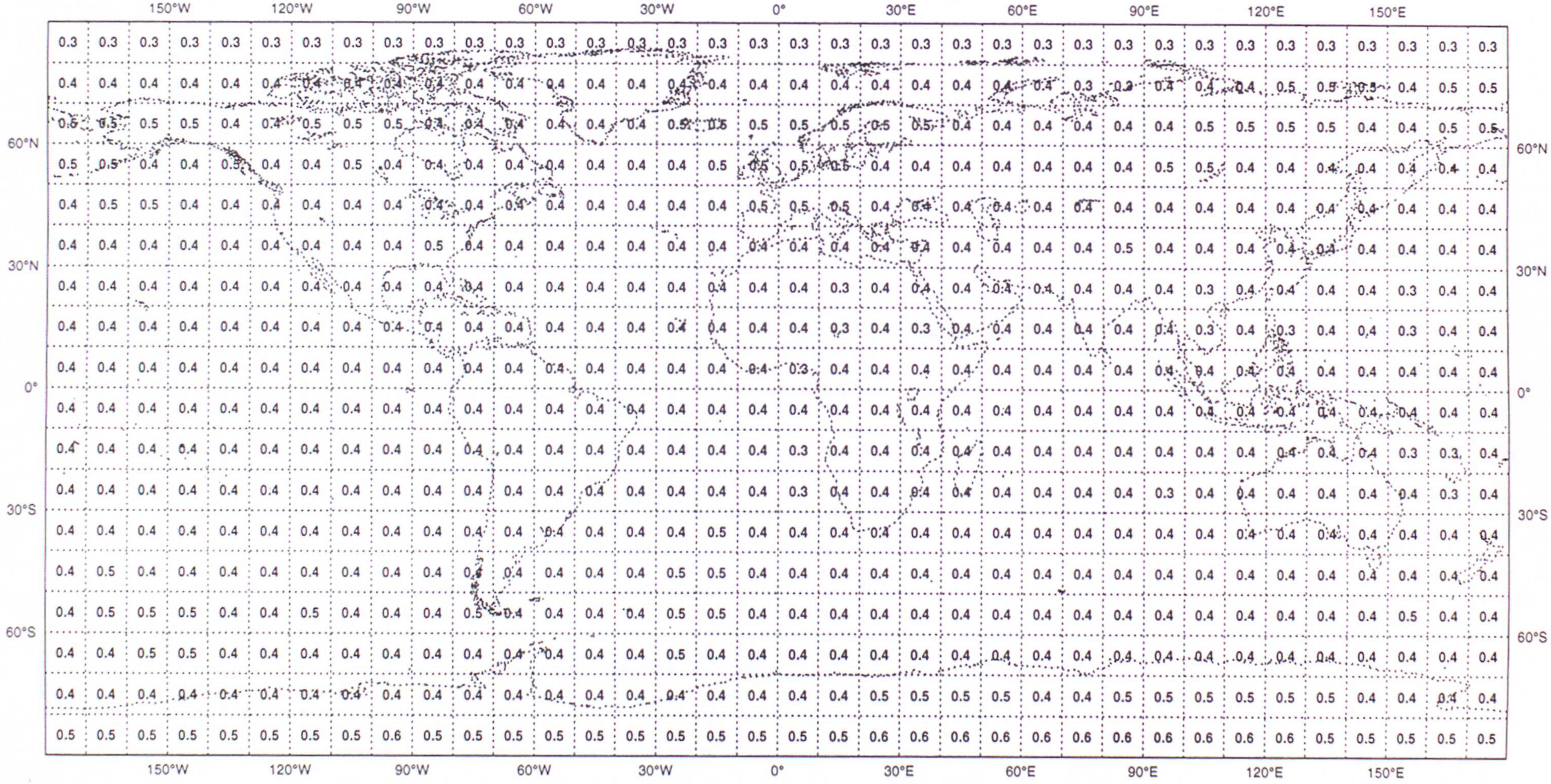

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.5 0.7 0.6 0.8 1.0 1.2 0.7 0.5 0.5 0.5 0.6 0.5 0.4 0.5 0.6 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4
0.4 0.5 0.5 0.4 0.4 0.5 0.6 0.6 0.7 0.5 0.6 0.8 1.4 2.2 2.4 1.4 0.5 0.6 0.4 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.5 0.5 0.5 0.4 0.4 0.4
0.5 0.5 0.7 0.8 1.0 0.9 0.5 0.5 0.5 0.6 0.5 0.8 0.6 1.8 1.2 0.7 0.6 0.5 0.6 0.7 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.6 0.4 0.4 0.5 0.6 0.6 0.6 0.6 0.6
0.4 0.5 0.6 0.5 0.7 0.8 0.6 0.5 0.4 0.4 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.6 0.6 0.8 0.6 0.6 0.5 0.5 0.5 0.3
0.4 0.3 0.4 0.4 0.4 0.5 0.7 0.7 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.3 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 1.5 1.4 1.0 0.8 0.6 0.5 0.4 0.5 0.4 0.4 0.4
0.4 0.4 0.4 0.4 0.3 0.3 0.7 0.7 0.3 0.4 0.5 0.4 0.4 0.4 0.3 0.3 0.3 0.6 0.4 0.5 0.6 0.6 0.8 1.1 1.1 2.0 2.1 2.1 1.0 0.6 0.5 0.5 0.4 0.4 0.4 0.4
0.3 0.4 0.4 0.4 0.3 0.2 0.4 0.7 0.4 0.5 0.4 0.3 0.3 0.3 0.2 0.3 0.4 0.6 0.5 0.6 0.5 0.6 0.6 0.7 0.7 0.7 1.1 1.1 0.7 0.4 0.4 0.3 0.3 0.3 0.3 0.4
0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.2 0.3 0.3 0.3 0.5 0.8 0.5 0.6 0.6 0.8 0.7 0.4 0.2 0.4 0.3 0.4 0.4 0.3 0.5 0.4 0.3 0.4 0.3 0.3
0.5 0.6 0.5 0.5 0.5 0.6 0.6 0.6 0.6 0.4 0.6 0.5 0.4 0.3 0.3 0.4 0.5 0.6 0.5 0.6 0.8 0.9 0.7 0.3 0.4 0.4 0.5 0.7 0.6 0.7 0.5 0.4 0.4 0.4 0.6 0.7
0.6 0.4 0.3 0.3 0.2 0.3 0.2 0.3 0.3 0.3 0.8 0.8 0.8 0.8 0.5 0.4 0.3 0.3 0.6 1.0 1.1 0.9 0.3 0.5 0.6 0.6 0.6 0.7 0.8 0.7 0.7 0.7 0.8 0.6 0.9 1.0
0.4 0.5 0.4 0.5 0.4 0.2 0.3 0.3 0.3 0.2 0.9 1.4 0.9 0.9 0.3 0.2 0.2 0.2 0.2 0.9 1.1 1.0 0.8 0.5 0.6 0.5 0.4 0.3 0.2 0.3 1.1 0.9 0.6 0.3 0.4 0.5
0.4 0.3 0.4 0.7 0.5 0.3 0.3 0.3 0.2 0.2 0.4 1.7 1.1 0.8 0.6 0.4 0.2 0.2 0.2 0.9 1.0 0.7 0.6 0.4 0.5 0.3 0.3 0.2 0.3 0.7 0.9 0.7 0.6 0.4 0.3 0.3
0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.6 1.2 0.9 0.4 0.4 0.5 0.4 0.4 0.3 0.4 0.7 0.5 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.5 0.6 0.6 0.6 0.4 0.3 0.4
0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.3 0.3 0.7 0.7 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.3 0.4 0.4 0.5 0.5
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.6 0.5 0.4 0.5 0.4 0.4 0.3 0.4 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.4
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.7 0.6 0.6 0.5 0.6 0.5 0.4 0.4 0.4 0.4 0.5 0.7 1.1 0.8 0.6 0.8 1.0 1.1 0.9 0.9 0.9 0.7 0.6 0.5 0.5
0.6 0.6 0.6 0.6 0.9 1.0 0.9 0.9 0.9 0.8 0.6 0.6 0.5 0.5 0.5 0.7 1.1 1.7 2.1 2.3 2.5 2.6 2.5 2.3 2.0 1.9 2.3 2.5 2.3 2.0 2.0 1.6 1.4 1.3 0.9 0.7
0.9 0.7 0.6 0.7 0.7 0.8 0.9 1.1 1.1 0.8 0.6 0.6 0.6 0.7 0.7 0.8 0.8 0.9 1.0 1.1 1.3 1.4 1.6 1.9 2.1 2.1 2.1 2.0 1.8 1.5 1.4 1.2 1.1 1.2 0.9 0.9

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



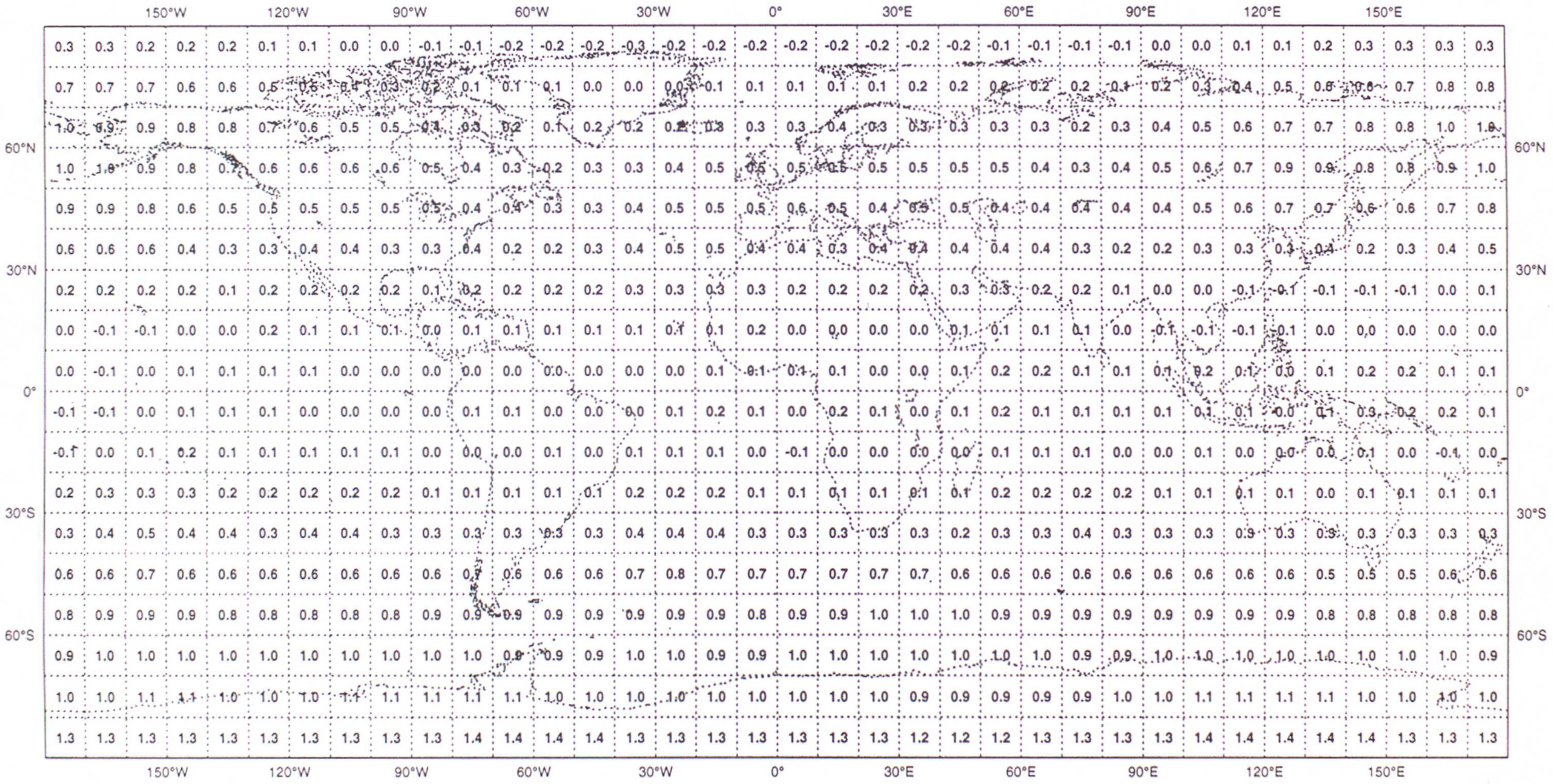
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | -0.1 | -0.2 | -0.2 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 |
| 0.5 | 0.5 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.6 |
| 0.5 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.4 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 |
| 0.5 | 0.4 | 0.4 | 0.2 | 0.1 | -0.1 | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 |
| 0.2 | 0.2 | 0.2 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 |
| -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | -0.2 | -0.1 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 |
| -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.4 |
| -0.3 | -0.4 | -0.4 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.4 | -0.4 |
| -0.3 | -0.3 | -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.2 | -0.3 | -0.3 | -0.3 | -0.4 | -0.4 |
| -0.4 | -0.4 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.3 | -0.2 |
| -0.3 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.3 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | -0.1 |
| -0.1 | 0.1 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.2 |
| 0.4 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.3 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 |
| 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.4 |
| 0.7 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 |

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | -0.1 | -0.1 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 |
| 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 0.4 | 0.3 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | -0.1 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 |
| 1.0 | 0.9 | 0.9 | 0.8 | 0.8 | 0.7 | 0.6 | 0.5 | 0.5 | 0.4 | 0.3 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 1.0 | 1.0 |
| 1.0 | 1.0 | 0.9 | 0.8 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.4 | 0.3 | 0.2 | 0.3 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.9 | 0.9 | 0.8 | 0.8 | 0.9 | 1.0 |
| 0.9 | 0.9 | 0.8 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.7 | 0.7 | 0.6 | 0.6 | 0.7 | 0.8 |
| 0.6 | 0.6 | 0.6 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.2 | 0.2 | 0.3 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.2 | 0.3 | 0.4 | 0.5 |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.1 |
| 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 0.0 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.2 | 0.1 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 |
| -0.1 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.1 | 0.0 | 0.2 | 0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.3 | 0.2 | 0.2 | 0.1 |
| -0.1 | 0.0 | 0.1 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -0.1 | 0.0 |
| 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| 0.3 | 0.4 | 0.5 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 | 0.7 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 |
| 0.8 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.9 |
| 1.0 | 1.0 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 | 0.9 | 0.9 | 0.9 | 1.0 | 1.0 | 1.1 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 |
| 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.3 | 1.2 | 1.2 | 1.2 | 1.3 | 1.3 | 1.3 | 1.3 | 1.4 | 1.4 | 1.4 | 1.4 | 1.4 | 1.3 | 1.3 | 1.3 |

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

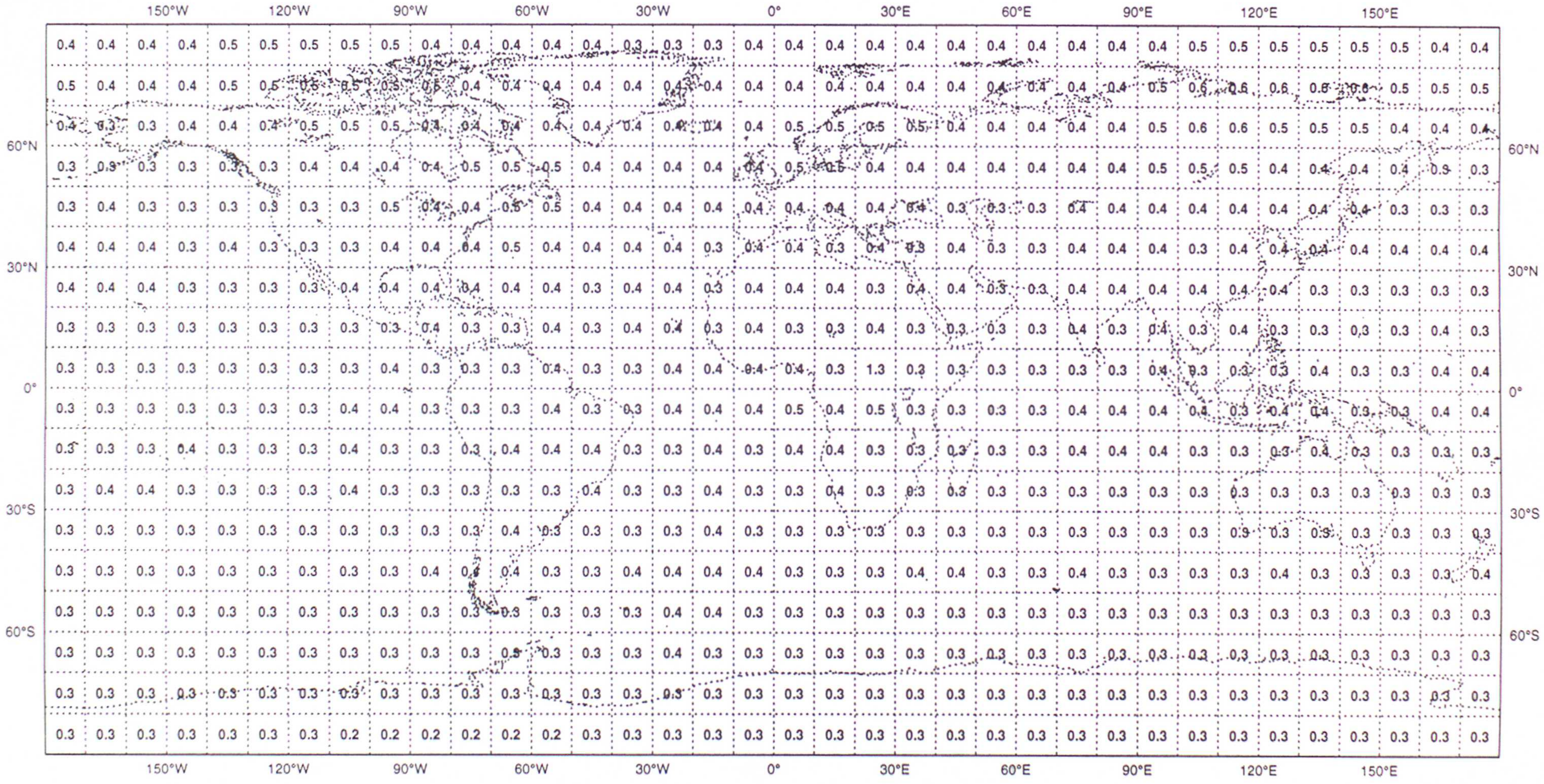
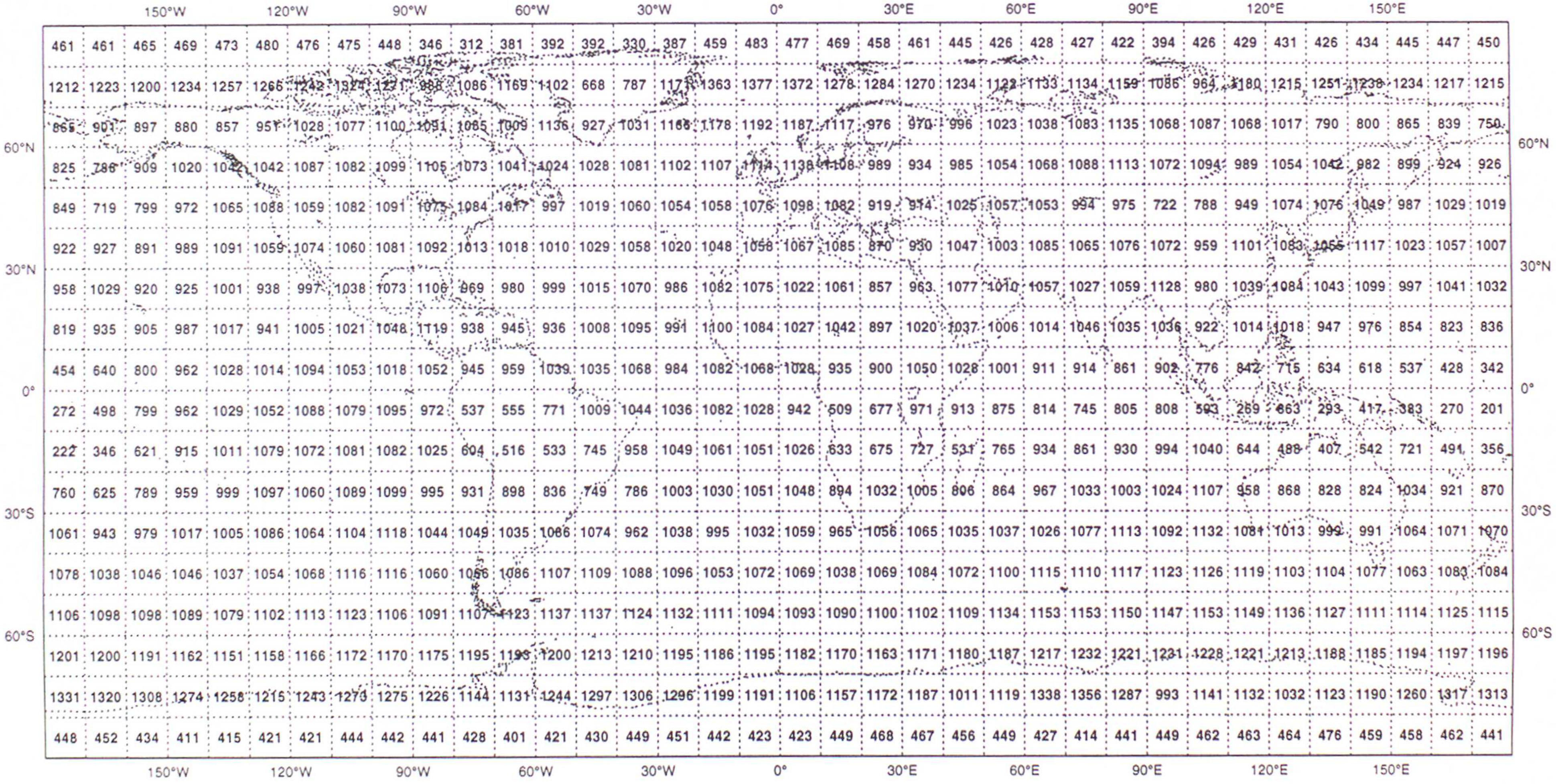
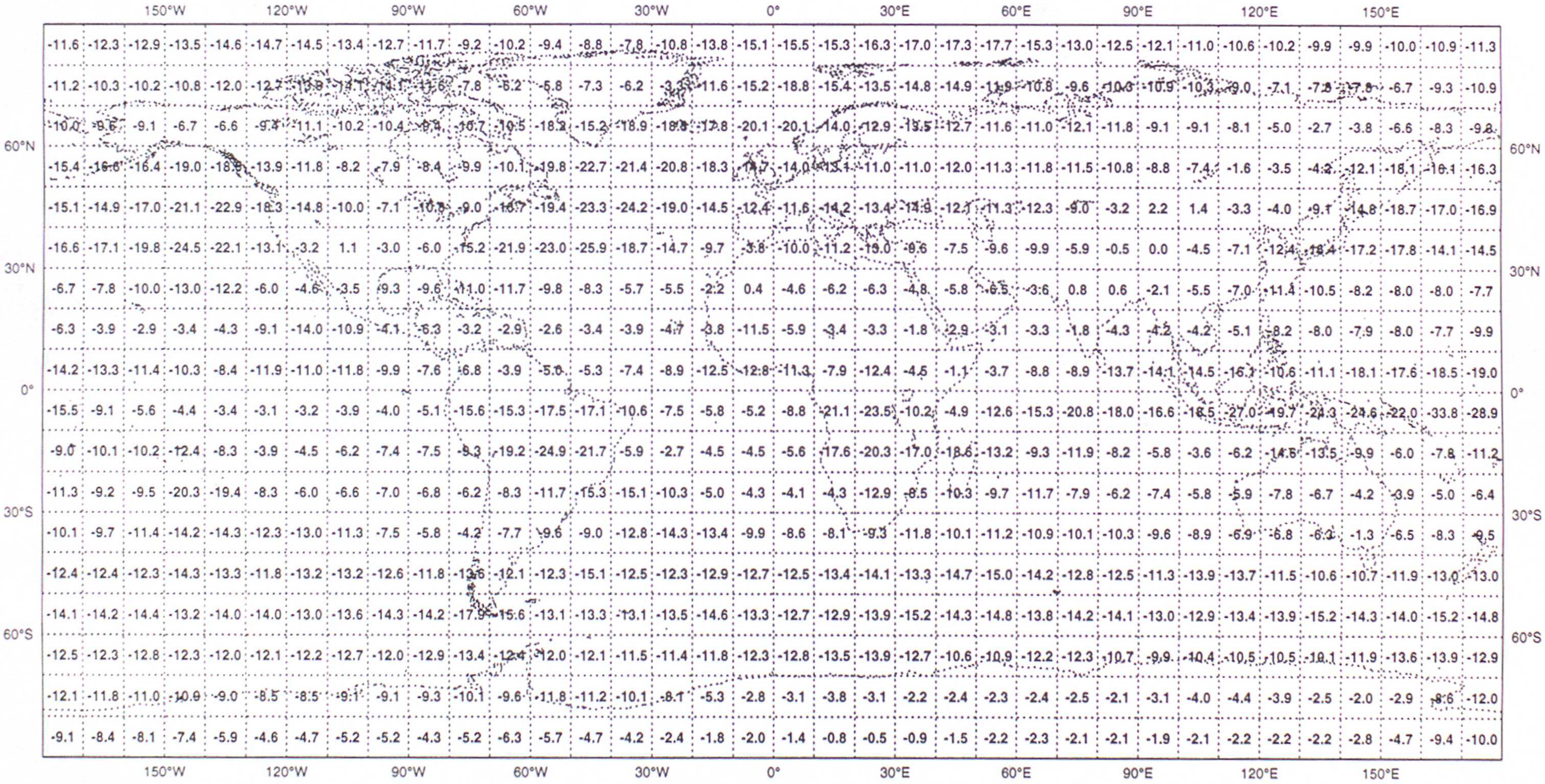

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 55. ATOVS mean daily count. JANUARY 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 564865



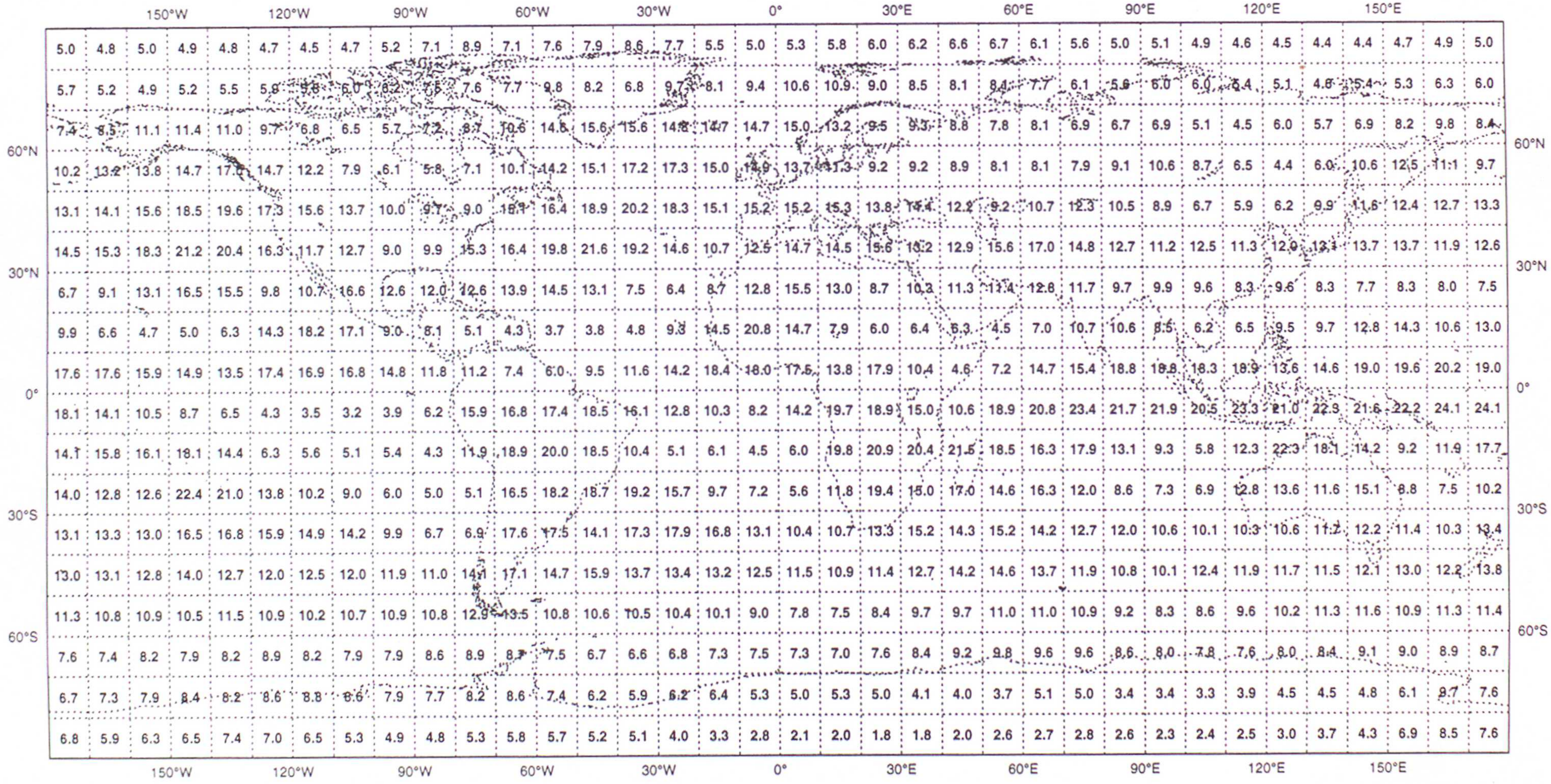
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 461 | 461 | 465 | 469 | 473 | 480 | 476 | 475 | 448 | 346 | 312 | 381 | 392 | 392 | 330 | 387 | 459 | 483 | 477 | 469 | 458 | 461 | 445 | 426 | 428 | 427 | 422 | 394 | 426 | 429 | 431 | 426 | 434 | 445 | 447 | 450 |
| 1212 | 1223 | 1200 | 1234 | 1257 | 1266 | 1242 | 1324 | 1271 | 988 | 1086 | 1169 | 1102 | 668 | 787 | 1171 | 1363 | 1377 | 1372 | 1278 | 1284 | 1270 | 1234 | 1122 | 1133 | 1134 | 1159 | 1086 | 964 | 1180 | 1215 | 1251 | 1238 | 1234 | 1217 | 1215 |
| 865 | 901 | 897 | 880 | 857 | 951 | 1028 | 1077 | 1100 | 1091 | 1065 | 1009 | 1136 | 927 | 1031 | 1166 | 1178 | 1192 | 1187 | 1117 | 976 | 970 | 996 | 1023 | 1038 | 1083 | 1135 | 1068 | 1087 | 1068 | 1017 | 790 | 800 | 865 | 839 | 750 |
| 825 | 786 | 909 | 1020 | 1042 | 1042 | 1087 | 1082 | 1099 | 1105 | 1073 | 1041 | 1024 | 1028 | 1081 | 1102 | 1107 | 1114 | 1138 | 1108 | 989 | 934 | 985 | 1054 | 1068 | 1088 | 1113 | 1072 | 1094 | 989 | 1054 | 1042 | 982 | 899 | 924 | 926 |
| 849 | 719 | 799 | 972 | 1065 | 1088 | 1059 | 1082 | 1091 | 1075 | 1084 | 1017 | 997 | 1019 | 1060 | 1054 | 1058 | 1076 | 1098 | 1082 | 919 | 914 | 1025 | 1057 | 1053 | 994 | 975 | 722 | 788 | 949 | 1074 | 1076 | 1049 | 987 | 1029 | 1019 |
| 922 | 927 | 891 | 989 | 1091 | 1059 | 1074 | 1060 | 1081 | 1092 | 1013 | 1018 | 1010 | 1029 | 1058 | 1020 | 1048 | 1058 | 1067 | 1085 | 870 | 930 | 1047 | 1003 | 1085 | 1065 | 1076 | 1072 | 959 | 1101 | 1083 | 1055 | 1117 | 1023 | 1057 | 1007 |
| 958 | 1029 | 920 | 925 | 1001 | 938 | 997 | 1038 | 1073 | 1106 | 969 | 980 | 999 | 1015 | 1070 | 986 | 1082 | 1075 | 1022 | 1061 | 857 | 963 | 1077 | 1010 | 1057 | 1027 | 1059 | 1128 | 980 | 1039 | 1084 | 1043 | 1099 | 997 | 1041 | 1032 |
| 819 | 935 | 905 | 987 | 1017 | 941 | 1005 | 1021 | 1048 | 1119 | 938 | 945 | 936 | 1008 | 1095 | 991 | 1100 | 1084 | 1027 | 1042 | 897 | 1020 | 1037 | 1006 | 1014 | 1046 | 1035 | 1036 | 922 | 1014 | 1018 | 947 | 976 | 854 | 823 | 836 |
| 454 | 640 | 800 | 962 | 1028 | 1014 | 1094 | 1053 | 1018 | 1052 | 945 | 959 | 1039 | 1035 | 1068 | 984 | 1082 | 1068 | 1028 | 935 | 900 | 1050 | 1028 | 1001 | 911 | 914 | 861 | 902 | 776 | 842 | 715 | 634 | 618 | 537 | 428 | 342 |
| 272 | 498 | 799 | 962 | 1029 | 1052 | 1088 | 1079 | 1095 | 972 | 537 | 555 | 771 | 1009 | 1044 | 1036 | 1082 | 1028 | 942 | 509 | 677 | 971 | 913 | 875 | 814 | 745 | 805 | 808 | 593 | 269 | 663 | 293 | 417 | 383 | 270 | 201 |
| 222 | 346 | 621 | 915 | 1011 | 1079 | 1072 | 1081 | 1082 | 1025 | 604 | 516 | 533 | 745 | 958 | 1049 | 1061 | 1051 | 1026 | 633 | 675 | 727 | 531 | 765 | 934 | 861 | 930 | 994 | 1040 | 644 | 488 | 407 | 542 | 721 | 491 | 356 |
| 760 | 625 | 789 | 959 | 999 | 1097 | 1060 | 1089 | 1099 | 995 | 931 | 898 | 836 | 749 | 786 | 1003 | 1030 | 1051 | 1048 | 894 | 1032 | 1005 | 806 | 864 | 967 | 1033 | 1003 | 1024 | 1107 | 958 | 868 | 828 | 824 | 1034 | 921 | 870 |
| 1061 | 943 | 979 | 1017 | 1005 | 1086 | 1064 | 1104 | 1118 | 1044 | 1049 | 1035 | 1066 | 1074 | 962 | 1038 | 995 | 1032 | 1059 | 965 | 1056 | 1065 | 1035 | 1037 | 1026 | 1077 | 1113 | 1092 | 1132 | 1081 | 1013 | 999 | 991 | 1064 | 1071 | 1070 |
| 1078 | 1038 | 1046 | 1046 | 1037 | 1054 | 1068 | 1116 | 1116 | 1060 | 1056 | 1086 | 1107 | 1109 | 1088 | 1096 | 1053 | 1072 | 1069 | 1038 | 1069 | 1084 | 1072 | 1100 | 1115 | 1110 | 1117 | 1123 | 1126 | 1119 | 1103 | 1104 | 1077 | 1063 | 1083 | 1084 |
| 1106 | 1098 | 1098 | 1089 | 1079 | 1102 | 1113 | 1123 | 1106 | 1091 | 1107 | 1123 | 1137 | 1137 | 1124 | 1132 | 1111 | 1094 | 1093 | 1090 | 1100 | 1102 | 1109 | 1134 | 1153 | 1153 | 1150 | 1147 | 1153 | 1149 | 1136 | 1127 | 1111 | 1114 | 1125 | 1115 |
| 1201 | 1200 | 1191 | 1162 | 1151 | 1158 | 1166 | 1172 | 1170 | 1175 | 1195 | 1193 | 1200 | 1213 | 1210 | 1195 | 1186 | 1195 | 1182 | 1170 | 1163 | 1171 | 1180 | 1187 | 1217 | 1232 | 1221 | 1231 | 1228 | 1221 | 1213 | 1188 | 1185 | 1194 | 1197 | 1196 |
| 1331 | 1320 | 1308 | 1274 | 1258 | 1215 | 1243 | 1273 | 1275 | 1226 | 1144 | 1131 | 1244 | 1297 | 1306 | 1296 | 1199 | 1191 | 1106 | 1157 | 1172 | 1187 | 1011 | 1119 | 1338 | 1356 | 1287 | 993 | 1141 | 1132 | 1032 | 1123 | 1190 | 1260 | 1317 | 1313 |
| 448 | 452 | 434 | 411 | 415 | 421 | 421 | 444 | 442 | 441 | 428 | 401 | 421 | 430 | 449 | 451 | 442 | 423 | 423 | 449 | 468 | 467 | 456 | 449 | 427 | 414 | 441 | 449 | 462 | 463 | 464 | 476 | 459 | 458 | 462 | 441 |

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



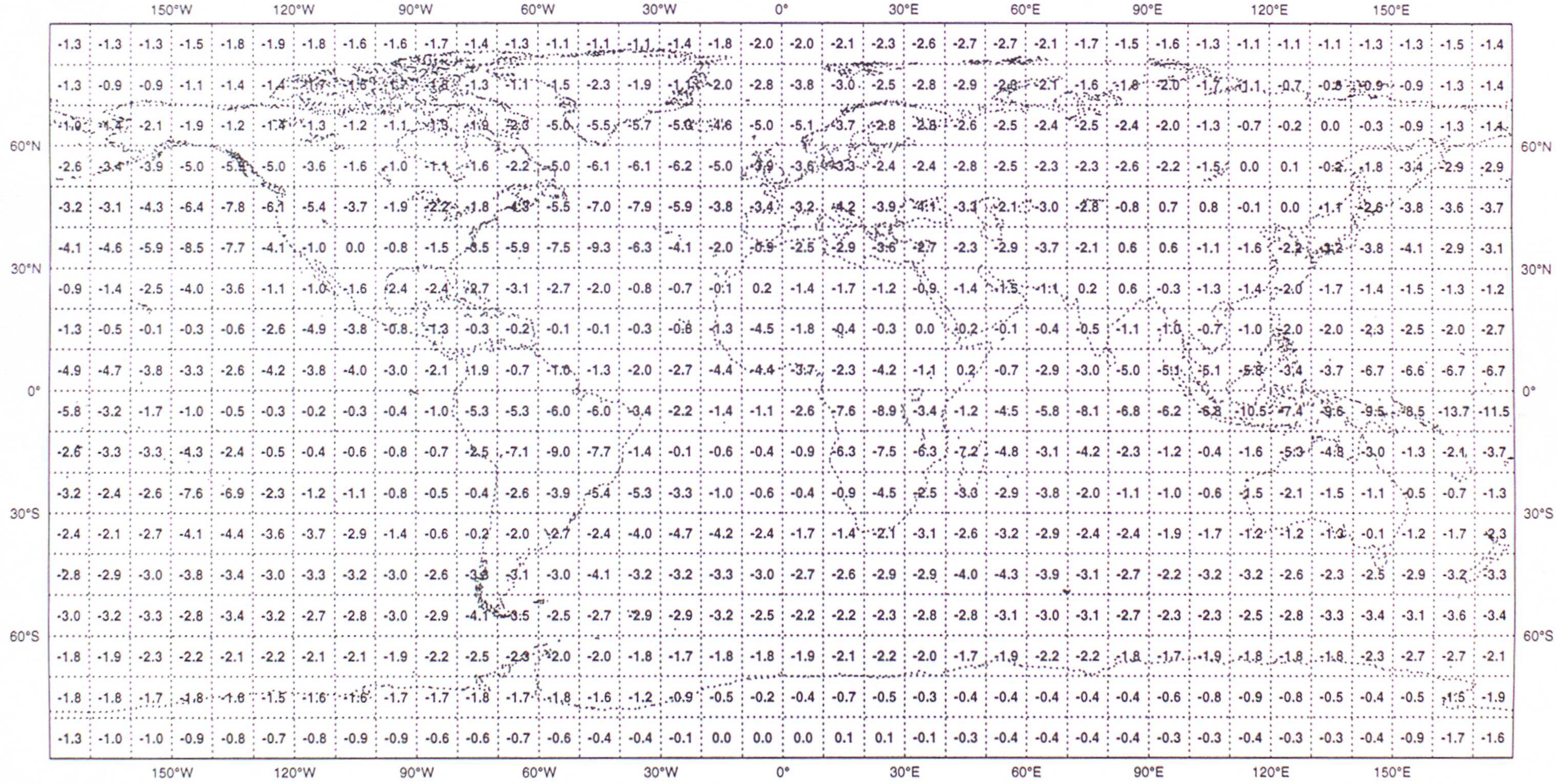
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -11.6 | -12.3 | -12.9 | -13.5 | -14.6 | -14.7 | -14.5 | -13.4 | -12.7 | -11.7 | -9.2 | -10.2 | -9.4 | -8.8 | -7.8 | -10.8 | -13.8 | -15.1 | -15.5 | -15.3 | -16.3 | -17.0 | -17.3 | -17.7 | -15.3 | -13.0 | -12.5 | -12.1 | -11.0 | -10.6 | -10.2 | -9.9 | -9.9 | -10.0 | -10.9 | -11.3 |
| -11.2 | -10.3 | -10.2 | -10.8 | -12.0 | -12.7 | -13.8 | -14.1 | -14.1 | -11.6 | -7.8 | -6.2 | -5.8 | -7.3 | -6.2 | -3.3 | -11.6 | -15.2 | -18.8 | -15.4 | -13.5 | -14.8 | -14.9 | -11.9 | -10.8 | -9.6 | -10.0 | -10.9 | -10.3 | -9.0 | -7.1 | -7.8 | -7.8 | -6.7 | -9.3 | -10.9 |
| -10.0 | -9.6 | -9.1 | -6.7 | -6.6 | -9.4 | -11.1 | -10.2 | -10.4 | -9.4 | -10.7 | -10.5 | -18.2 | -15.2 | -18.9 | -18.8 | -17.8 | -20.1 | -20.1 | -14.0 | -12.9 | -13.5 | -12.7 | -11.6 | -11.0 | -12.1 | -11.8 | -9.1 | -9.1 | -8.1 | -5.0 | -2.7 | -3.8 | -6.6 | -8.3 | -9.8 |
| -15.4 | -16.6 | -16.4 | -19.0 | -18.8 | -13.9 | -11.8 | -8.2 | -7.9 | -8.4 | -9.9 | -10.1 | -19.8 | -22.7 | -21.4 | -20.8 | -18.3 | -14.7 | -14.0 | -13.1 | -11.0 | -11.0 | -12.0 | -11.3 | -11.8 | -11.5 | -10.8 | -8.8 | -7.4 | -1.6 | -3.5 | -4.2 | -12.1 | -18.1 | -16.1 | -16.3 |
| -15.1 | -14.9 | -17.0 | -21.1 | -22.9 | -18.3 | -14.8 | -10.0 | -7.1 | -10.8 | -9.0 | -16.7 | -19.4 | -23.3 | -24.2 | -19.0 | -14.5 | -12.4 | -11.6 | -14.2 | -13.4 | -14.9 | -12.1 | -11.3 | -12.3 | -9.0 | -3.2 | 2.2 | 1.4 | -3.3 | -4.0 | -9.1 | -14.8 | -18.7 | -17.0 | -16.9 |
| -16.6 | -17.1 | -19.8 | -24.5 | -22.1 | -13.1 | -3.2 | 1.1 | -3.0 | -6.0 | -15.2 | -21.9 | -23.0 | -25.9 | -18.7 | -14.7 | -9.7 | -3.8 | -10.0 | -11.2 | -19.0 | -8.6 | -7.5 | -9.6 | -9.9 | -5.9 | -0.5 | 0.0 | -4.5 | -7.1 | -12.4 | -18.4 | -17.2 | -17.8 | -14.1 | -14.5 |
| -6.7 | -7.8 | -10.0 | -13.0 | -12.2 | -6.0 | -4.6 | -3.5 | -9.3 | -9.6 | -11.0 | -11.7 | -9.8 | -8.3 | -5.7 | -5.5 | -2.2 | 0.4 | -4.6 | -6.2 | -6.3 | -4.8 | -5.8 | -6.5 | -3.6 | 0.8 | 0.6 | -2.1 | -5.5 | -7.0 | -11.4 | -10.5 | -8.2 | -8.0 | -8.0 | -7.7 |
| -6.3 | -3.9 | -2.9 | -3.4 | -4.3 | -9.1 | -14.0 | -10.9 | -4.1 | -6.3 | -3.2 | -2.9 | -2.6 | -3.4 | -3.9 | -4.7 | -3.8 | -11.5 | -5.9 | -3.4 | -3.3 | -1.8 | -2.9 | -3.1 | -3.3 | -1.8 | -4.3 | -4.2 | -4.2 | -5.1 | -8.2 | -8.0 | -7.9 | -8.0 | -7.7 | -9.9 |
| -14.2 | -13.3 | -11.4 | -10.3 | -8.4 | -11.9 | -11.0 | -11.8 | -9.9 | -7.6 | -6.8 | -3.9 | -5.0 | -5.3 | -7.4 | -8.9 | -12.5 | -12.8 | -11.3 | -7.9 | -12.4 | -4.5 | -1.1 | -3.7 | -8.8 | -8.9 | -13.7 | -14.1 | -14.5 | -16.1 | -10.6 | -11.1 | -18.1 | -17.6 | -18.5 | -19.0 |
| -15.5 | -9.1 | -5.6 | -4.4 | -3.4 | -3.1 | -3.2 | -3.9 | -4.0 | -5.1 | -15.6 | -15.3 | -17.5 | -17.1 | -10.6 | -7.5 | -5.8 | -5.2 | -8.8 | -21.1 | -23.5 | -10.2 | -4.9 | -12.6 | -15.3 | -20.8 | -18.0 | -16.6 | -18.5 | -27.0 | -19.7 | -24.3 | -24.6 | -22.0 | -33.8 | -28.9 |
| -9.0 | -10.1 | -10.2 | -12.4 | -8.3 | -3.9 | -4.5 | -6.2 | -7.4 | -7.5 | -9.3 | -19.2 | -24.9 | -21.7 | -5.9 | -2.7 | -4.5 | -4.5 | -5.6 | -17.6 | -20.3 | -17.0 | -18.6 | -13.2 | -9.3 | -11.9 | -8.2 | -5.8 | -3.6 | -6.2 | -14.6 | -13.5 | -9.9 | -6.0 | -7.8 | -11.2 |
| -11.3 | -9.2 | -9.5 | -20.3 | -19.4 | -8.3 | -6.0 | -6.6 | -7.0 | -6.8 | -6.2 | -8.3 | -11.7 | -15.3 | -15.1 | -10.3 | -5.0 | -4.3 | -4.1 | -4.3 | -12.9 | -8.5 | -10.3 | -9.7 | -11.7 | -7.9 | -6.2 | -7.4 | -5.8 | -5.9 | -7.8 | -6.7 | -4.2 | -3.9 | -5.0 | -6.4 |
| -10.1 | -9.7 | -11.4 | -14.2 | -14.3 | -12.3 | -13.0 | -11.3 | -7.5 | -5.8 | -4.2 | -7.7 | -9.6 | -9.0 | -12.8 | -14.3 | -13.4 | -9.9 | -8.6 | -8.1 | -9.3 | -11.8 | -10.1 | -11.2 | -10.9 | -10.1 | -10.3 | -9.6 | -8.9 | -6.9 | -6.8 | -6.3 | -1.3 | -6.5 | -8.3 | -9.5 |
| -12.4 | -12.4 | -12.3 | -14.3 | -13.3 | -11.8 | -13.2 | -13.2 | -12.6 | -11.8 | -13.6 | -12.1 | -12.3 | -15.1 | -12.5 | -12.3 | -12.9 | -12.7 | -12.5 | -13.4 | -14.1 | -13.3 | -14.7 | -15.0 | -14.2 | -12.8 | -12.5 | -11.3 | -13.9 | -13.7 | -11.5 | -10.6 | -10.7 | -11.9 | -13.0 | -13.0 |
| -14.1 | -14.2 | -14.4 | -13.2 | -14.0 | -14.0 | -13.0 | -13.6 | -14.3 | -14.2 | -17.9 | -15.6 | -13.1 | -13.3 | -13.1 | -13.5 | -14.6 | -13.3 | -12.7 | -12.9 | -13.9 | -15.2 | -14.3 | -14.8 | -13.8 | -14.2 | -14.1 | -13.0 | -12.9 | -13.4 | -13.9 | -15.2 | -14.3 | -14.0 | -15.2 | -14.8 |
| -12.5 | -12.3 | -12.8 | -12.3 | -12.0 | -12.1 | -12.2 | -12.7 | -12.0 | -12.9 | -13.4 | -12.4 | -12.0 | -12.1 | -11.5 | -11.4 | -11.8 | -12.3 | -12.8 | -13.5 | -13.9 | -12.7 | -10.6 | -10.9 | -12.2 | -12.3 | -10.7 | -9.9 | -10.4 | -10.5 | -10.5 | -10.1 | -11.9 | -13.6 | -13.9 | -12.9 |
| -12.1 | -11.8 | -11.0 | -10.9 | -9.0 | -8.5 | -8.5 | -9.1 | -9.1 | -9.3 | -10.1 | -9.6 | -11.8 | -11.2 | -10.1 | -8.1 | -5.3 | -2.8 | -3.1 | -3.8 | -3.1 | -2.2 | -2.4 | -2.3 | -2.4 | -2.5 | -2.1 | -3.1 | -4.0 | -4.4 | -3.9 | -2.5 | -2.0 | -2.9 | -8.6 | -12.0 |
| -9.1 | -8.4 | -8.1 | -7.4 | -5.9 | -4.6 | -4.7 | -5.2 | -5.2 | -4.3 | -5.2 | -6.3 | -5.7 | -4.7 | -4.2 | -2.4 | -1.8 | -2.0 | -1.4 | -0.8 | -0.5 | -0.9 | -1.5 | -2.2 | -2.3 | -2.1 | -2.1 | -1.9 | -2.1 | -2.2 | -2.2 | -2.2 | -2.8 | -4.7 | -9.4 | -10.0 |

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



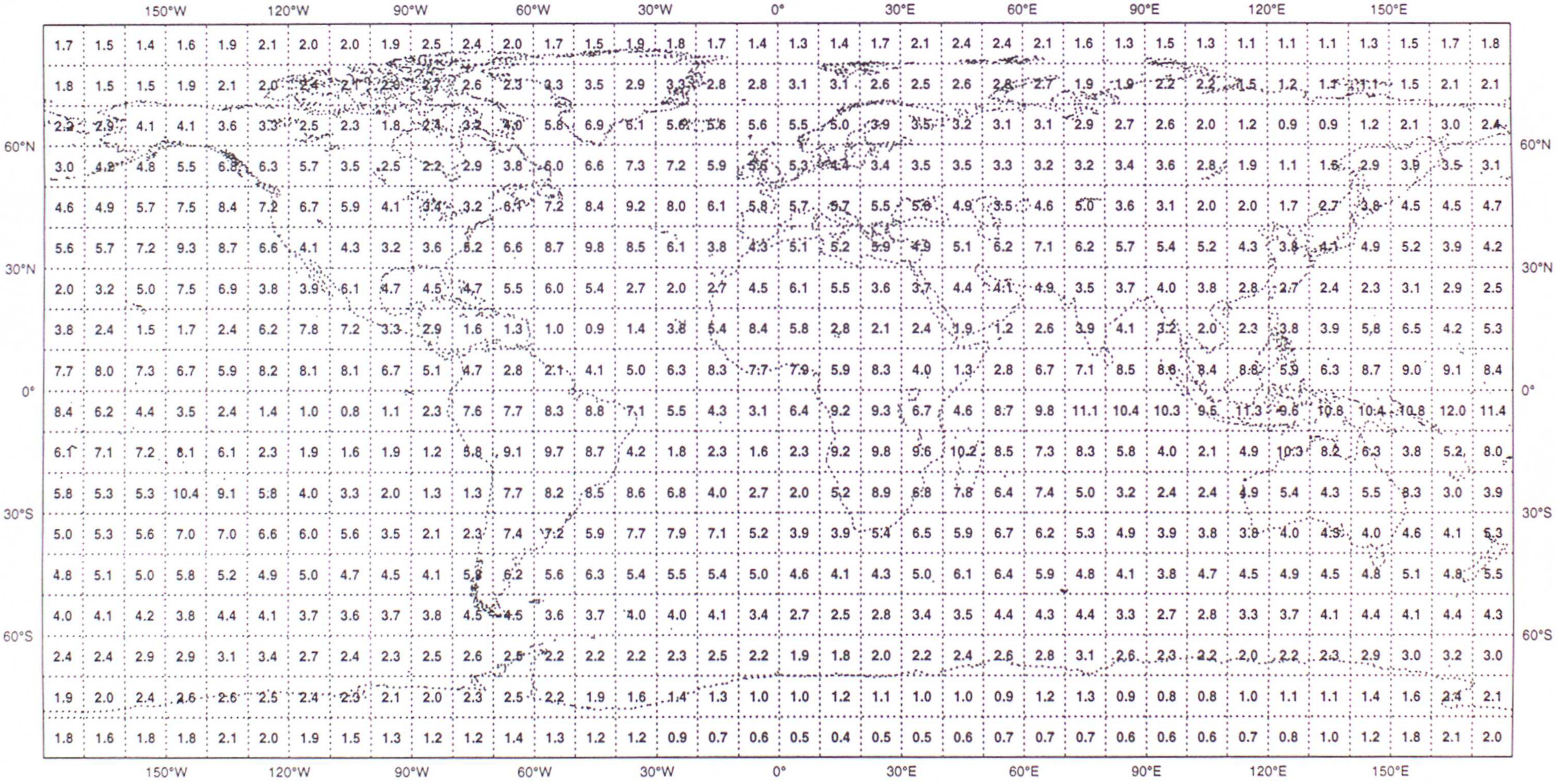
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 5.0 | 4.8 | 5.0 | 4.9 | 4.8 | 4.7 | 4.5 | 4.7 | 5.2 | 7.1 | 8.9 | 7.1 | 7.6 | 7.9 | 8.6 | 7.7 | 5.5 | 5.0 | 5.3 | 5.8 | 6.0 | 6.2 | 6.6 | 6.7 | 6.1 | 5.6 | 5.0 | 5.1 | 4.9 | 4.6 | 4.5 | 4.4 | 4.4 | 4.7 | 4.9 | 5.0 |
| 5.7 | 5.2 | 4.9 | 5.2 | 5.5 | 5.8 | 5.8 | 6.0 | 6.2 | 7.5 | 7.6 | 7.7 | 9.8 | 8.2 | 6.8 | 9.7 | 8.1 | 9.4 | 10.6 | 10.9 | 9.0 | 8.5 | 8.1 | 8.4 | 7.7 | 6.1 | 5.6 | 6.0 | 6.0 | 5.4 | 5.1 | 4.6 | 5.4 | 5.3 | 6.3 | 6.0 |
| 7.4 | 8.5 | 11.1 | 11.4 | 11.0 | 9.7 | 6.8 | 6.5 | 5.7 | 7.2 | 8.7 | 10.6 | 14.6 | 15.6 | 15.6 | 14.8 | 14.7 | 14.7 | 15.0 | 13.2 | 9.5 | 9.3 | 8.8 | 7.8 | 8.1 | 6.9 | 6.7 | 6.9 | 5.1 | 4.5 | 6.0 | 5.7 | 6.9 | 8.2 | 9.8 | 8.4 |
| 10.2 | 13.2 | 13.8 | 14.7 | 17.6 | 14.7 | 12.2 | 7.9 | 6.1 | 5.8 | 7.1 | 10.1 | 14.2 | 15.1 | 17.2 | 17.3 | 15.0 | 14.9 | 13.7 | 11.3 | 9.2 | 9.2 | 8.9 | 8.1 | 8.1 | 7.9 | 9.1 | 10.6 | 8.7 | 6.5 | 4.4 | 6.0 | 10.6 | 12.5 | 11.1 | 9.7 |
| 13.1 | 14.1 | 15.6 | 18.5 | 19.6 | 17.3 | 15.6 | 13.7 | 10.0 | 9.7 | 9.0 | 18.1 | 16.4 | 18.9 | 20.2 | 18.3 | 15.1 | 15.2 | 15.2 | 15.3 | 13.8 | 14.4 | 12.2 | 9.2 | 10.7 | 12.3 | 10.5 | 8.9 | 6.7 | 5.9 | 6.2 | 9.9 | 11.6 | 12.4 | 12.7 | 13.3 |
| 14.5 | 15.3 | 18.3 | 21.2 | 20.4 | 16.3 | 11.7 | 12.7 | 9.0 | 9.9 | 15.3 | 16.4 | 19.8 | 21.6 | 19.2 | 14.6 | 10.7 | 12.5 | 14.7 | 14.5 | 15.6 | 13.2 | 12.9 | 15.6 | 17.0 | 14.8 | 12.7 | 11.2 | 12.5 | 11.3 | 12.0 | 13.1 | 13.7 | 13.7 | 11.9 | 12.6 |
| 6.7 | 9.1 | 13.1 | 16.5 | 15.5 | 9.8 | 10.7 | 16.6 | 12.6 | 12.0 | 12.6 | 13.9 | 14.5 | 13.1 | 7.5 | 6.4 | 8.7 | 12.8 | 15.5 | 13.0 | 8.7 | 10.3 | 11.3 | 11.4 | 12.6 | 11.7 | 9.7 | 9.9 | 9.6 | 8.3 | 9.6 | 8.3 | 7.7 | 8.3 | 8.0 | 7.5 |
| 9.9 | 6.6 | 4.7 | 5.0 | 6.3 | 14.3 | 18.2 | 17.1 | 9.0 | 8.1 | 5.1 | 4.3 | 3.7 | 3.8 | 4.8 | 9.3 | 14.5 | 20.8 | 14.7 | 7.9 | 6.0 | 6.4 | 6.3 | 4.5 | 7.0 | 10.7 | 10.6 | 8.5 | 6.2 | 6.5 | 9.5 | 9.7 | 12.8 | 14.3 | 10.6 | 13.0 |
| 17.6 | 17.6 | 15.9 | 14.9 | 13.5 | 17.4 | 16.9 | 16.8 | 14.8 | 11.8 | 11.2 | 7.4 | 6.0 | 9.5 | 11.6 | 14.2 | 18.4 | 18.0 | 17.5 | 13.8 | 17.9 | 10.4 | 4.6 | 7.2 | 14.7 | 15.4 | 18.8 | 18.8 | 18.3 | 18.9 | 13.6 | 14.6 | 19.0 | 19.6 | 20.2 | 19.0 |
| 18.1 | 14.1 | 10.5 | 8.7 | 6.5 | 4.3 | 3.5 | 3.2 | 3.9 | 6.2 | 15.9 | 16.8 | 17.4 | 18.5 | 16.1 | 12.8 | 10.3 | 8.2 | 14.2 | 19.7 | 18.9 | 15.0 | 10.6 | 18.9 | 20.8 | 23.4 | 21.7 | 21.9 | 20.5 | 23.3 | 21.0 | 22.3 | 21.6 | 22.2 | 24.1 | 24.1 |
| 14.1 | 15.8 | 16.1 | 18.1 | 14.4 | 6.3 | 5.6 | 5.1 | 5.4 | 4.3 | 11.9 | 18.9 | 20.0 | 18.5 | 10.4 | 5.1 | 6.1 | 4.5 | 6.0 | 19.8 | 20.9 | 20.4 | 21.5 | 18.5 | 16.3 | 17.9 | 13.1 | 9.3 | 5.8 | 12.3 | 22.3 | 18.1 | 14.2 | 9.2 | 11.9 | 17.7 |
| 14.0 | 12.8 | 12.6 | 22.4 | 21.0 | 13.8 | 10.2 | 9.0 | 6.0 | 5.0 | 5.1 | 16.5 | 18.2 | 18.7 | 19.2 | 15.7 | 9.7 | 7.2 | 5.6 | 11.8 | 19.4 | 15.0 | 17.0 | 14.6 | 16.3 | 12.0 | 8.6 | 7.3 | 6.9 | 12.8 | 13.6 | 11.6 | 15.1 | 8.8 | 7.5 | 10.2 |
| 13.1 | 13.3 | 13.0 | 16.5 | 16.8 | 15.9 | 14.9 | 14.2 | 9.9 | 6.7 | 6.9 | 17.6 | 17.5 | 14.1 | 17.3 | 17.9 | 16.8 | 13.1 | 10.4 | 10.7 | 13.3 | 15.2 | 14.3 | 15.2 | 14.2 | 12.7 | 12.0 | 10.6 | 10.1 | 10.3 | 10.6 | 11.2 | 12.2 | 11.4 | 10.3 | 13.4 |
| 13.0 | 13.1 | 12.8 | 14.0 | 12.7 | 12.0 | 12.5 | 12.0 | 11.9 | 11.0 | 14.1 | 17.1 | 14.7 | 15.9 | 13.7 | 13.4 | 13.2 | 12.5 | 11.5 | 10.9 | 11.4 | 12.7 | 14.2 | 14.6 | 13.7 | 11.9 | 10.8 | 10.1 | 12.4 | 11.9 | 11.7 | 11.5 | 12.1 | 13.0 | 12.2 | 13.8 |
| 11.3 | 10.8 | 10.9 | 10.5 | 11.5 | 10.9 | 10.2 | 10.7 | 10.9 | 10.8 | 12.9 | 13.5 | 10.8 | 10.6 | 10.5 | 10.4 | 10.1 | 9.0 | 7.8 | 7.5 | 8.4 | 9.7 | 9.7 | 11.0 | 11.0 | 10.9 | 9.2 | 8.3 | 8.6 | 9.6 | 10.2 | 11.3 | 11.6 | 10.9 | 11.3 | 11.4 |
| 7.6 | 7.4 | 8.2 | 7.9 | 8.2 | 8.9 | 8.2 | 7.9 | 7.9 | 8.6 | 8.9 | 8.7 | 7.5 | 6.7 | 6.6 | 6.8 | 7.3 | 7.5 | 7.3 | 7.0 | 7.6 | 8.4 | 9.2 | 9.8 | 9.6 | 9.6 | 8.6 | 8.0 | 7.8 | 7.6 | 8.0 | 8.4 | 9.1 | 9.0 | 8.9 | 8.7 |
| 6.7 | 7.3 | 7.9 | 8.4 | 8.2 | 8.6 | 8.8 | 8.6 | 7.9 | 7.7 | 8.2 | 8.6 | 7.4 | 6.2 | 5.9 | 6.2 | 6.4 | 5.3 | 5.0 | 5.3 | 5.0 | 4.1 | 4.0 | 3.7 | 5.1 | 5.0 | 3.4 | 3.4 | 3.3 | 3.9 | 4.5 | 4.5 | 4.8 | 6.1 | 9.7 | 7.6 |
| 6.8 | 5.9 | 6.3 | 6.5 | 7.4 | 7.0 | 6.5 | 5.3 | 4.9 | 4.8 | 5.3 | 5.8 | 5.7 | 5.2 | 5.1 | 4.0 | 3.3 | 2.8 | 2.1 | 2.0 | 1.8 | 1.8 | 2.0 | 2.6 | 2.7 | 2.8 | 2.6 | 2.3 | 2.4 | 2.5 | 3.0 | 3.7 | 4.3 | 6.9 | 8.5 | 7.6 |

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



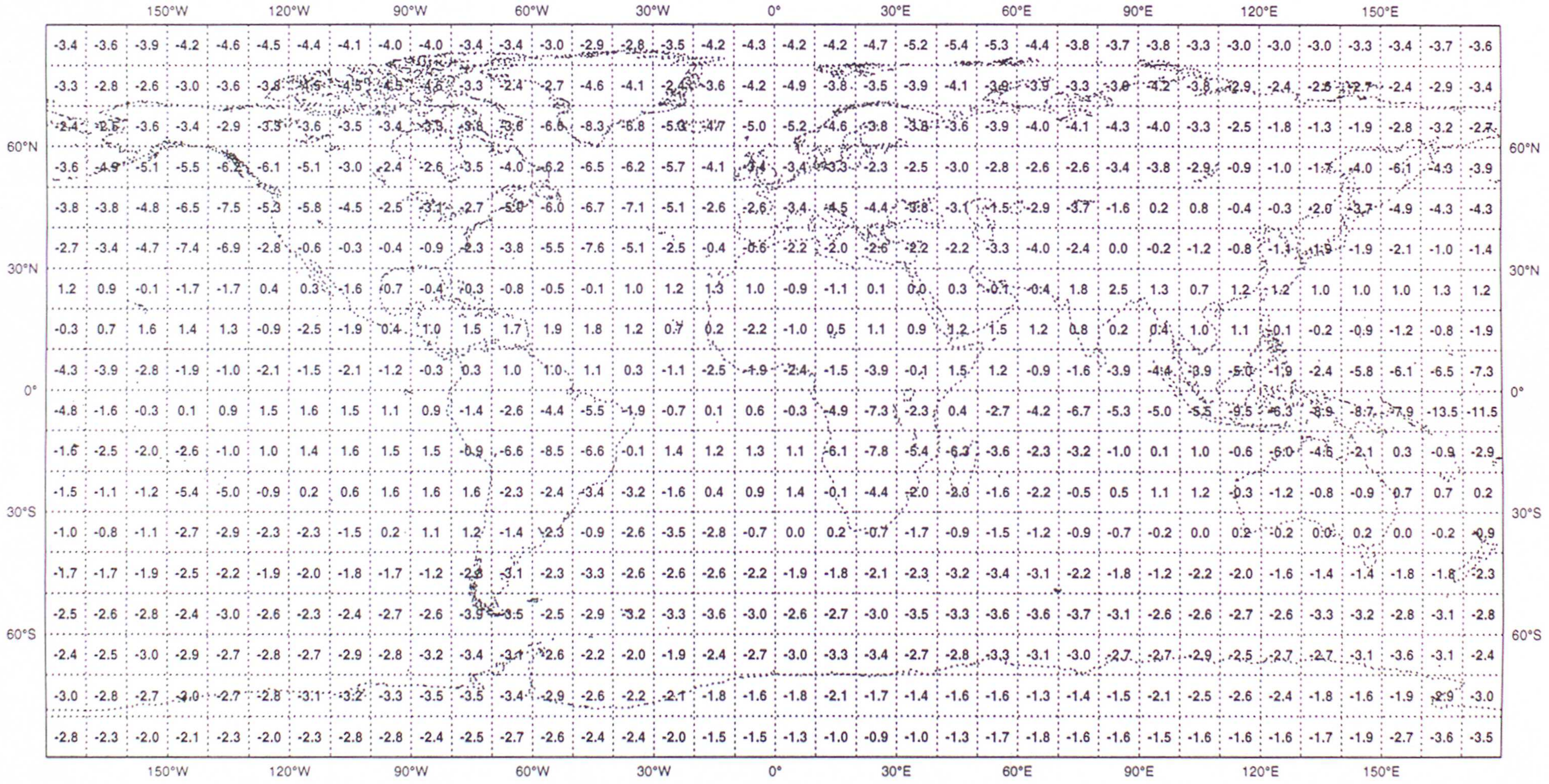
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -1.3 | -1.3 | -1.3 | -1.5 | -1.8 | -1.9 | -1.8 | -1.6 | -1.6 | -1.7 | -1.4 | -1.3 | -1.1 | -1.1 | -1.1 | -1.4 | -1.8 | -2.0 | -2.0 | -2.1 | -2.3 | -2.6 | -2.7 | -2.7 | -2.1 | -1.7 | -1.5 | -1.6 | -1.3 | -1.1 | -1.1 | -1.1 | -1.3 | -1.3 | -1.5 | -1.4 |
| -1.3 | -0.9 | -0.9 | -1.1 | -1.4 | -1.4 | -1.7 | -1.5 | -1.7 | -1.8 | -1.3 | -1.1 | -1.5 | -2.3 | -1.9 | -1.1 | -2.0 | -2.8 | -3.8 | -3.0 | -2.5 | -2.8 | -2.9 | -2.8 | -2.1 | -1.6 | -1.8 | -2.0 | -1.7 | -1.1 | -0.7 | -0.8 | -0.9 | -0.9 | -1.3 | -1.4 |
| -1.0 | -1.4 | -2.1 | -1.9 | -1.2 | -1.4 | -1.3 | -1.2 | -1.1 | -1.3 | -1.9 | -2.3 | -5.0 | -5.5 | -5.7 | -5.0 | -4.6 | -5.0 | -5.1 | -3.7 | -2.8 | -2.8 | -2.6 | -2.5 | -2.4 | -2.5 | -2.4 | -2.0 | -1.3 | -0.7 | -0.2 | 0.0 | -0.3 | -0.9 | -1.3 | -1.4 |
| -2.6 | -3.4 | -3.9 | -5.0 | -5.8 | -5.0 | -3.6 | -1.6 | -1.0 | -1.1 | -1.6 | -2.2 | -5.0 | -6.1 | -6.1 | -6.2 | -5.0 | -3.9 | -3.6 | -3.3 | -2.4 | -2.4 | -2.8 | -2.5 | -2.3 | -2.3 | -2.6 | -2.2 | -1.5 | 0.0 | 0.1 | -0.2 | -1.8 | -3.4 | -2.9 | -2.9 |
| -3.2 | -3.1 | -4.3 | -6.4 | -7.8 | -6.1 | -5.4 | -3.7 | -1.9 | -2.2 | -1.8 | -4.3 | -5.5 | -7.0 | -7.9 | -5.9 | -3.8 | -3.4 | -3.2 | -4.2 | -3.9 | -4.1 | -3.3 | -2.1 | -3.0 | -2.8 | -0.8 | 0.7 | 0.8 | -0.1 | 0.0 | -1.1 | -2.6 | -3.8 | -3.6 | -3.7 |
| -4.1 | -4.6 | -5.9 | -8.5 | -7.7 | -4.1 | -1.0 | 0.0 | -0.8 | -1.5 | -8.5 | -5.9 | -7.5 | -9.3 | -6.3 | -4.1 | -2.0 | -0.9 | -2.5 | -2.9 | -3.6 | -2.7 | -2.3 | -2.9 | -3.7 | -2.1 | 0.6 | 0.6 | -1.1 | -1.6 | -2.2 | -3.2 | -3.8 | -4.1 | -2.9 | -3.1 |
| -0.9 | -1.4 | -2.5 | -4.0 | -3.6 | -1.1 | -1.0 | -1.6 | -2.4 | -2.4 | -2.7 | -3.1 | -2.7 | -2.0 | -0.8 | -0.7 | -0.1 | 0.2 | -1.4 | -1.7 | -1.2 | -0.9 | -1.4 | -1.5 | -1.1 | 0.2 | 0.6 | -0.3 | -1.3 | -1.4 | -2.0 | -1.7 | -1.4 | -1.5 | -1.3 | -1.2 |
| -1.3 | -0.5 | -0.1 | -0.3 | -0.6 | -2.6 | -4.9 | -3.8 | -0.8 | -1.3 | -0.3 | -0.2 | -0.1 | -0.1 | -0.3 | -0.8 | -1.3 | -4.5 | -1.8 | -0.4 | -0.3 | 0.0 | -0.2 | -0.1 | -0.4 | -0.5 | -1.1 | -1.0 | -0.7 | -1.0 | -2.0 | -2.0 | -2.3 | -2.5 | -2.0 | -2.7 |
| -4.9 | -4.7 | -3.8 | -3.3 | -2.6 | -4.2 | -3.8 | -4.0 | -3.0 | -2.1 | -1.9 | -0.7 | -1.0 | -1.3 | -2.0 | -2.7 | -4.4 | -4.4 | -3.7 | -2.3 | -4.2 | -1.1 | 0.2 | -0.7 | -2.9 | -3.0 | -5.0 | -5.1 | -5.1 | -5.8 | -3.4 | -3.7 | -6.7 | -6.6 | -6.7 | -6.7 |
| -5.8 | -3.2 | -1.7 | -1.0 | -0.5 | -0.3 | -0.2 | -0.3 | -0.4 | -1.0 | -5.3 | -5.3 | -6.0 | -6.0 | -3.4 | -2.2 | -1.4 | -1.1 | -2.6 | -7.6 | -8.9 | -3.4 | -1.2 | -4.5 | -5.8 | -8.1 | -6.8 | -6.2 | -6.8 | -10.5 | -7.4 | -9.6 | -9.5 | -8.5 | -13.7 | -11.5 |
| -2.6 | -3.3 | -3.3 | -4.3 | -2.4 | -0.5 | -0.4 | -0.6 | -0.8 | -0.7 | -2.5 | -7.1 | -9.0 | -7.7 | -1.4 | -0.1 | -0.6 | -0.4 | -0.9 | -6.3 | -7.5 | -6.3 | -7.2 | -4.8 | -3.1 | -4.2 | -2.3 | -1.2 | -0.4 | -1.6 | -5.3 | -4.8 | -3.0 | -1.3 | -2.1 | -3.7 |
| -3.2 | -2.4 | -2.6 | -7.6 | -6.9 | -2.3 | -1.2 | -1.1 | -0.8 | -0.5 | -0.4 | -2.6 | -3.9 | -5.4 | -5.3 | -3.3 | -1.0 | -0.6 | -0.4 | -0.9 | -4.5 | -2.5 | -3.3 | -2.9 | -3.8 | -2.0 | -1.1 | -1.0 | -0.6 | -1.5 | -2.1 | -1.5 | -1.1 | -0.5 | -0.7 | -1.3 |
| -2.4 | -2.1 | -2.7 | -4.1 | -4.4 | -3.6 | -3.7 | -2.9 | -1.4 | -0.6 | -0.2 | -2.0 | -2.7 | -2.4 | -4.0 | -4.7 | -4.2 | -2.4 | -1.7 | -1.4 | -2.1 | -3.1 | -2.6 | -3.2 | -2.9 | -2.4 | -2.4 | -1.9 | -1.7 | -1.2 | -1.2 | -1.3 | -0.1 | -1.2 | -1.7 | -2.3 |
| -2.8 | -2.9 | -3.0 | -3.8 | -3.4 | -3.0 | -3.3 | -3.2 | -3.0 | -2.6 | -3.8 | -3.1 | -3.0 | -4.1 | -3.2 | -3.2 | -3.3 | -3.0 | -2.7 | -2.6 | -2.9 | -2.9 | -4.0 | -4.3 | -3.9 | -3.1 | -2.7 | -2.2 | -3.2 | -3.2 | -2.6 | -2.3 | -2.5 | -2.9 | -3.2 | -3.3 |
| -3.0 | -3.2 | -3.3 | -2.8 | -3.4 | -3.2 | -2.7 | -2.8 | -3.0 | -2.9 | -4.1 | -3.5 | -2.5 | -2.7 | -2.9 | -2.9 | -3.2 | -2.5 | -2.2 | -2.2 | -2.3 | -2.8 | -2.8 | -3.1 | -3.0 | -3.1 | -2.7 | -2.3 | -2.3 | -2.5 | -2.8 | -3.3 | -3.4 | -3.1 | -3.6 | -3.4 |
| -1.8 | -1.9 | -2.3 | -2.2 | -2.1 | -2.2 | -2.1 | -2.1 | -1.9 | -2.2 | -2.5 | -2.3 | -2.0 | -2.0 | -1.8 | -1.7 | -1.8 | -1.8 | -1.9 | -2.1 | -2.2 | -2.0 | -1.7 | -1.9 | -2.2 | -2.2 | -1.8 | -1.7 | -1.9 | -1.8 | -1.8 | -1.8 | -2.3 | -2.7 | -2.7 | -2.1 |
| -1.8 | -1.8 | -1.7 | -1.8 | -1.6 | -1.5 | -1.6 | -1.6 | -1.7 | -1.7 | -1.8 | -1.7 | -1.8 | -1.6 | -1.2 | -0.9 | -0.5 | -0.2 | -0.4 | -0.7 | -0.5 | -0.3 | -0.4 | -0.4 | -0.4 | -0.4 | -0.4 | -0.6 | -0.8 | -0.9 | -0.8 | -0.5 | -0.4 | -0.5 | -1.5 | -1.9 |
| -1.3 | -1.0 | -1.0 | -0.9 | -0.8 | -0.7 | -0.8 | -0.9 | -0.9 | -0.6 | -0.6 | -0.7 | -0.6 | -0.4 | -0.4 | -0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | -0.1 | -0.3 | -0.4 | -0.4 | -0.4 | -0.4 | -0.3 | -0.3 | -0.4 | -0.3 | -0.3 | -0.4 | -0.9 | -1.7 | -1.6 |

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



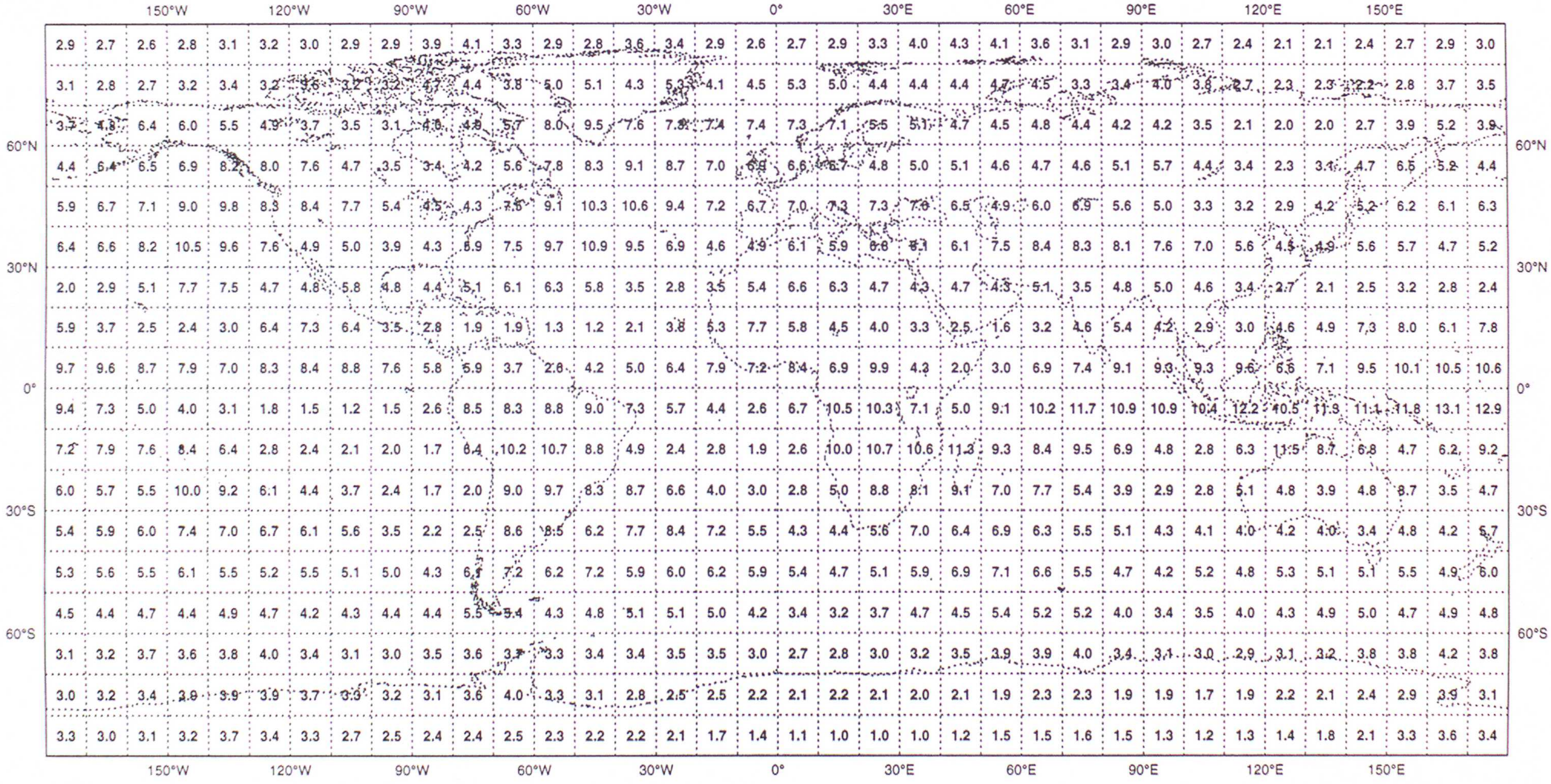
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1.7 | 1.5 | 1.4 | 1.6 | 1.9 | 2.1 | 2.0 | 2.0 | 1.9 | 2.5 | 2.4 | 2.0 | 1.7 | 1.5 | 1.9 | 1.8 | 1.7 | 1.4 | 1.3 | 1.4 | 1.7 | 2.1 | 2.4 | 2.4 | 2.1 | 1.6 | 1.3 | 1.5 | 1.3 | 1.1 | 1.1 | 1.1 | 1.3 | 1.5 | 1.7 | 1.8 |
| 1.8 | 1.5 | 1.5 | 1.9 | 2.1 | 2.0 | 2.4 | 2.1 | 2.0 | 2.7 | 2.6 | 2.3 | 3.3 | 3.5 | 2.9 | 3.3 | 2.8 | 2.8 | 3.1 | 3.1 | 2.6 | 2.5 | 2.6 | 2.8 | 2.7 | 1.9 | 1.9 | 2.2 | 2.2 | 1.5 | 1.2 | 1.1 | 1.1 | 1.5 | 2.1 | 2.1 |
| 2.2 | 2.9 | 4.1 | 4.1 | 3.6 | 3.3 | 2.5 | 2.3 | 1.8 | 2.4 | 3.2 | 4.0 | 5.8 | 6.9 | 6.1 | 5.6 | 5.6 | 5.6 | 5.5 | 5.0 | 3.9 | 3.5 | 3.2 | 3.1 | 3.1 | 2.9 | 2.7 | 2.6 | 2.0 | 1.2 | 0.9 | 0.9 | 1.2 | 2.1 | 3.0 | 2.4 |
| 3.0 | 4.2 | 4.8 | 5.5 | 6.8 | 6.3 | 5.7 | 3.5 | 2.5 | 2.2 | 2.9 | 3.8 | 6.0 | 6.6 | 7.3 | 7.2 | 5.9 | 5.6 | 5.3 | 4.4 | 3.4 | 3.5 | 3.5 | 3.3 | 3.2 | 3.2 | 3.4 | 3.6 | 2.8 | 1.9 | 1.1 | 1.6 | 2.9 | 3.9 | 3.5 | 3.1 |
| 4.6 | 4.9 | 5.7 | 7.5 | 8.4 | 7.2 | 6.7 | 5.9 | 4.1 | 3.4 | 3.2 | 6.1 | 7.2 | 8.4 | 9.2 | 8.0 | 6.1 | 5.8 | 5.7 | 5.7 | 5.5 | 5.6 | 4.9 | 3.5 | 4.6 | 5.0 | 3.6 | 3.1 | 2.0 | 2.0 | 1.7 | 2.7 | 3.8 | 4.5 | 4.5 | 4.7 |
| 5.6 | 5.7 | 7.2 | 9.3 | 8.7 | 6.6 | 4.1 | 4.3 | 3.2 | 3.6 | 5.2 | 6.6 | 8.7 | 9.8 | 8.5 | 6.1 | 3.8 | 4.3 | 5.1 | 5.2 | 5.9 | 4.9 | 5.1 | 6.2 | 7.1 | 6.2 | 5.7 | 5.4 | 5.2 | 4.3 | 3.8 | 4.1 | 4.9 | 5.2 | 3.9 | 4.2 |
| 2.0 | 3.2 | 5.0 | 7.5 | 6.9 | 3.8 | 3.9 | 6.1 | 4.7 | 4.5 | 4.7 | 5.5 | 6.0 | 5.4 | 2.7 | 2.0 | 2.7 | 4.5 | 6.1 | 5.5 | 3.6 | 3.7 | 4.4 | 4.1 | 4.9 | 3.5 | 3.7 | 4.0 | 3.8 | 2.8 | 2.7 | 2.4 | 2.3 | 3.1 | 2.9 | 2.5 |
| 3.8 | 2.4 | 1.5 | 1.7 | 2.4 | 6.2 | 7.8 | 7.2 | 3.3 | 2.9 | 1.6 | 1.3 | 1.0 | 0.9 | 1.4 | 3.8 | 5.4 | 8.4 | 5.8 | 2.8 | 2.1 | 2.4 | 1.9 | 1.2 | 2.6 | 3.9 | 4.1 | 3.2 | 2.0 | 2.3 | 3.8 | 3.9 | 5.8 | 6.5 | 4.2 | 5.3 |
| 7.7 | 8.0 | 7.3 | 6.7 | 5.9 | 8.2 | 8.1 | 8.1 | 6.7 | 5.1 | 4.7 | 2.8 | 2.1 | 4.1 | 5.0 | 6.3 | 8.3 | 7.7 | 7.9 | 5.9 | 8.3 | 4.0 | 1.3 | 2.8 | 6.7 | 7.1 | 8.5 | 8.6 | 8.4 | 8.8 | 5.9 | 6.3 | 8.7 | 9.0 | 9.1 | 8.4 |
| 8.4 | 6.2 | 4.4 | 3.5 | 2.4 | 1.4 | 1.0 | 0.8 | 1.1 | 2.3 | 7.6 | 7.7 | 8.3 | 8.8 | 7.1 | 5.5 | 4.3 | 3.1 | 6.4 | 9.2 | 9.3 | 6.7 | 4.6 | 8.7 | 9.8 | 11.1 | 10.4 | 10.3 | 9.5 | 11.3 | 9.6 | 10.8 | 10.4 | 10.8 | 12.0 | 11.4 |
| 6.1 | 7.1 | 7.2 | 8.1 | 6.1 | 2.3 | 1.9 | 1.6 | 1.9 | 1.2 | 5.8 | 9.1 | 9.7 | 8.7 | 4.2 | 1.8 | 2.3 | 1.6 | 2.3 | 9.2 | 9.8 | 9.6 | 10.2 | 8.5 | 7.3 | 8.3 | 5.8 | 4.0 | 2.1 | 4.9 | 10.3 | 8.2 | 6.3 | 3.8 | 5.2 | 8.0 |
| 5.8 | 5.3 | 5.3 | 10.4 | 9.1 | 5.8 | 4.0 | 3.3 | 2.0 | 1.3 | 1.3 | 7.7 | 8.2 | 8.5 | 8.6 | 6.8 | 4.0 | 2.7 | 2.0 | 5.2 | 8.9 | 6.8 | 7.8 | 6.4 | 7.4 | 5.0 | 3.2 | 2.4 | 2.4 | 4.9 | 5.4 | 4.3 | 5.5 | 8.3 | 3.0 | 3.9 |
| 5.0 | 5.3 | 5.6 | 7.0 | 7.0 | 6.6 | 6.0 | 5.6 | 3.5 | 2.1 | 2.3 | 7.4 | 7.2 | 5.9 | 7.7 | 7.9 | 7.1 | 5.2 | 3.9 | 3.9 | 5.4 | 6.5 | 5.9 | 6.7 | 6.2 | 5.3 | 4.9 | 3.9 | 3.8 | 3.8 | 4.0 | 4.3 | 4.0 | 4.6 | 4.1 | 5.3 |
| 4.8 | 5.1 | 5.0 | 5.8 | 5.2 | 4.9 | 5.0 | 4.7 | 4.5 | 4.1 | 5.8 | 6.2 | 5.6 | 6.3 | 5.4 | 5.5 | 5.4 | 5.0 | 4.6 | 4.1 | 4.3 | 5.0 | 6.1 | 6.4 | 5.9 | 4.8 | 4.1 | 3.8 | 4.7 | 4.5 | 4.9 | 4.5 | 4.8 | 5.1 | 4.8 | 5.5 |
| 4.0 | 4.1 | 4.2 | 3.8 | 4.4 | 4.1 | 3.7 | 3.6 | 3.7 | 3.8 | 4.5 | 4.5 | 3.6 | 3.7 | 4.0 | 4.0 | 4.1 | 3.4 | 2.7 | 2.5 | 2.8 | 3.4 | 3.5 | 4.4 | 4.3 | 4.4 | 3.3 | 2.7 | 2.8 | 3.3 | 3.7 | 4.1 | 4.4 | 4.1 | 4.4 | 4.3 |
| 2.4 | 2.4 | 2.9 | 2.9 | 3.1 | 3.4 | 2.7 | 2.4 | 2.3 | 2.5 | 2.6 | 2.5 | 2.2 | 2.2 | 2.2 | 2.3 | 2.5 | 2.2 | 1.9 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 3.1 | 2.6 | 2.3 | 2.2 | 2.0 | 2.2 | 2.3 | 2.9 | 3.0 | 3.2 | 3.0 |
| 1.9 | 2.0 | 2.4 | 2.6 | 2.6 | 2.5 | 2.4 | 2.3 | 2.1 | 2.0 | 2.3 | 2.5 | 2.2 | 1.9 | 1.6 | 1.4 | 1.3 | 1.0 | 1.0 | 1.2 | 1.1 | 1.0 | 1.0 | 0.9 | 1.2 | 1.3 | 0.9 | 0.8 | 0.8 | 1.0 | 1.1 | 1.1 | 1.4 | 1.6 | 2.4 | 2.1 |
| 1.8 | 1.6 | 1.8 | 1.8 | 2.1 | 2.0 | 1.9 | 1.5 | 1.3 | 1.2 | 1.2 | 1.4 | 1.3 | 1.2 | 1.2 | 0.9 | 0.7 | 0.6 | 0.5 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.8 | 2.1 | 2.0 |

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -3.4 | -3.6 | -3.9 | -4.2 | -4.6 | -4.5 | -4.4 | -4.1 | -4.0 | -4.0 | -3.4 | -3.4 | -3.0 | -2.9 | -2.8 | -3.5 | -4.2 | -4.3 | -4.2 | -4.2 | -4.7 | -5.2 | -5.4 | -5.3 | -4.4 | -3.8 | -3.7 | -3.8 | -3.3 | -3.0 | -3.0 | -3.0 | -3.3 | -3.4 | -3.7 | -3.6 |
| -3.3 | -2.8 | -2.6 | -3.0 | -3.6 | -3.8 | -4.5 | -4.5 | -4.5 | -4.6 | -3.3 | -2.4 | -2.7 | -4.6 | -4.1 | -2.4 | -3.6 | -4.2 | -4.9 | -3.8 | -3.5 | -3.9 | -4.1 | -3.9 | -3.9 | -3.3 | -3.8 | -4.2 | -3.8 | -2.9 | -2.4 | -2.5 | -2.7 | -2.4 | -2.9 | -3.4 |
| -2.4 | -2.6 | -3.6 | -3.4 | -2.9 | -3.3 | -3.6 | -3.5 | -3.4 | -3.3 | -3.8 | -3.6 | -6.6 | -8.3 | -6.8 | -5.0 | -4.7 | -5.0 | -5.2 | -4.6 | -3.8 | -3.8 | -3.6 | -3.9 | -4.0 | -4.1 | -4.3 | -4.0 | -3.3 | -2.5 | -1.8 | -1.3 | -1.9 | -2.8 | -3.2 | -2.7 |
| -3.6 | -4.9 | -5.1 | -5.5 | -6.2 | -6.1 | -5.1 | -3.0 | -2.4 | -2.6 | -3.5 | -4.0 | -6.2 | -6.5 | -6.2 | -5.7 | -4.1 | -3.4 | -3.4 | -3.3 | -2.3 | -2.5 | -3.0 | -2.8 | -2.6 | -2.6 | -3.4 | -3.8 | -2.9 | -0.9 | -1.0 | -1.7 | -4.0 | -6.1 | -4.3 | -3.9 |
| -3.8 | -3.8 | -4.8 | -6.5 | -7.5 | -5.3 | -5.8 | -4.5 | -2.5 | -3.1 | -2.7 | -5.0 | -6.0 | -6.7 | -7.1 | -5.1 | -2.6 | -2.6 | -3.4 | -4.5 | -4.4 | -3.8 | -3.1 | -1.5 | -2.9 | -3.7 | -1.6 | 0.2 | 0.8 | -0.4 | -0.3 | -2.0 | -3.7 | -4.9 | -4.3 | -4.3 |
| -2.7 | -3.4 | -4.7 | -7.4 | -6.9 | -2.8 | -0.6 | -0.3 | -0.4 | -0.9 | -2.3 | -3.8 | -5.5 | -7.6 | -5.1 | -2.5 | -0.4 | -0.6 | -2.2 | -2.0 | -2.6 | -2.2 | -2.2 | -3.3 | -4.0 | -2.4 | 0.0 | -0.2 | -1.2 | -0.8 | -1.1 | -1.9 | -1.9 | -2.1 | -1.0 | -1.4 |
| 1.2 | 0.9 | -0.1 | -1.7 | -1.7 | 0.4 | 0.3 | -1.6 | -0.7 | -0.4 | -0.3 | -0.8 | -0.5 | -0.1 | 1.0 | 1.2 | 1.3 | 1.0 | -0.9 | -1.1 | 0.1 | 0.0 | 0.3 | -0.1 | -0.4 | 1.8 | 2.5 | 1.3 | 0.7 | 1.2 | 1.2 | 1.0 | 1.0 | 1.0 | 1.3 | 1.2 |
| -0.3 | 0.7 | 1.6 | 1.4 | 1.3 | -0.9 | -2.5 | -1.9 | 0.4 | 1.0 | 1.5 | 1.7 | 1.9 | 1.8 | 1.2 | 0.7 | 0.2 | -2.2 | -1.0 | 0.5 | 1.1 | 0.9 | 1.2 | 1.5 | 1.2 | 0.8 | 0.2 | 0.4 | 1.0 | 1.1 | -0.1 | -0.2 | -0.9 | -1.2 | -0.8 | -1.9 |
| -4.3 | -3.9 | -2.8 | -1.9 | -1.0 | -2.1 | -1.5 | -2.1 | -1.2 | -0.3 | 0.3 | 1.0 | 1.0 | 1.1 | 0.3 | -1.1 | -2.5 | -1.9 | -2.4 | -1.5 | -3.9 | -0.1 | 1.5 | 1.2 | -0.9 | -1.6 | -3.9 | -4.4 | -3.9 | -5.0 | -1.9 | -2.4 | -5.8 | -6.1 | -6.5 | -7.3 |
| -4.8 | -1.6 | -0.3 | 0.1 | 0.9 | 1.5 | 1.6 | 1.5 | 1.1 | 0.9 | -1.4 | -2.6 | -4.4 | -5.5 | -1.9 | -0.7 | 0.1 | 0.6 | -0.3 | -4.9 | -7.3 | -2.3 | 0.4 | -2.7 | -4.2 | -6.7 | -5.3 | -5.0 | -5.5 | -9.5 | -6.3 | -8.9 | -8.7 | -7.9 | -13.5 | -11.5 |
| -1.6 | -2.5 | -2.0 | -2.6 | -1.0 | 1.0 | 1.4 | 1.6 | 1.5 | 1.5 | -0.9 | -6.6 | -8.5 | -6.6 | -0.1 | 1.4 | 1.2 | 1.3 | 1.1 | -6.1 | -7.8 | -5.4 | -6.3 | -3.6 | -2.3 | -3.2 | -1.0 | 0.1 | 1.0 | -0.6 | -6.0 | -4.6 | -2.1 | 0.3 | -0.9 | -2.9 |
| -1.5 | -1.1 | -1.2 | -5.4 | -5.0 | -0.9 | 0.2 | 0.6 | 1.6 | 1.6 | 1.6 | -2.3 | -2.4 | -3.4 | -3.2 | -1.6 | 0.4 | 0.9 | 1.4 | -0.1 | -4.4 | -2.0 | -2.3 | -1.6 | -2.2 | -0.5 | 0.5 | 1.1 | 1.2 | -0.3 | -1.2 | -0.8 | -0.9 | 0.7 | 0.7 | 0.2 |
| -1.0 | -0.8 | -1.1 | -2.7 | -2.9 | -2.3 | -2.3 | -1.5 | 0.2 | 1.1 | 1.2 | -1.4 | -2.3 | -0.9 | -2.6 | -3.5 | -2.8 | -0.7 | 0.0 | 0.2 | -0.7 | -1.7 | -0.9 | -1.5 | -1.2 | -0.9 | -0.7 | -0.2 | 0.0 | 0.2 | -0.2 | 0.0 | 0.2 | 0.0 | -0.2 | -0.9 |
| -1.7 | -1.7 | -1.9 | -2.5 | -2.2 | -1.9 | -2.0 | -1.8 | -1.7 | -1.2 | -2.8 | -3.1 | -2.3 | -3.3 | -2.6 | -2.6 | -2.6 | -2.2 | -1.9 | -1.8 | -2.1 | -2.3 | -3.2 | -3.4 | -3.1 | -2.2 | -1.8 | -1.2 | -2.2 | -2.0 | -1.6 | -1.4 | -1.4 | -1.8 | -1.8 | -2.3 |
| -2.5 | -2.6 | -2.8 | -2.4 | -3.0 | -2.6 | -2.3 | -2.4 | -2.7 | -2.6 | -3.9 | -3.5 | -2.5 | -2.9 | -3.2 | -3.3 | -3.6 | -3.0 | -2.6 | -2.7 | -3.0 | -3.5 | -3.3 | -3.6 | -3.6 | -3.7 | -3.1 | -2.6 | -2.6 | -2.7 | -2.6 | -3.3 | -3.2 | -2.8 | -3.1 | -2.8 |
| -2.4 | -2.5 | -3.0 | -2.9 | -2.7 | -2.8 | -2.7 | -2.9 | -2.8 | -3.2 | -3.4 | -3.1 | -2.6 | -2.2 | -2.0 | -1.9 | -2.4 | -2.7 | -3.0 | -3.3 | -3.4 | -2.7 | -2.8 | -3.3 | -3.1 | -3.0 | -2.7 | -2.7 | -2.9 | -2.5 | -2.7 | -2.7 | -3.1 | -3.6 | -3.1 | -2.4 |
| -3.0 | -2.8 | -2.7 | -3.0 | -2.7 | -2.8 | -3.1 | -3.2 | -3.3 | -3.5 | -3.5 | -3.4 | -2.9 | -2.6 | -2.2 | -2.1 | -1.8 | -1.6 | -1.8 | -2.1 | -1.7 | -1.4 | -1.6 | -1.6 | -1.3 | -1.4 | -1.5 | -2.1 | -2.5 | -2.6 | -2.4 | -1.8 | -1.6 | -1.9 | -2.9 | -3.0 |
| -2.8 | -2.3 | -2.0 | -2.1 | -2.3 | -2.0 | -2.3 | -2.8 | -2.8 | -2.4 | -2.5 | -2.7 | -2.6 | -2.4 | -2.4 | -2.0 | -1.5 | -1.5 | -1.3 | -1.0 | -0.9 | -1.0 | -1.3 | -1.7 | -1.8 | -1.6 | -1.6 | -1.5 | -1.6 | -1.6 | -1.6 | -1.6 | -1.7 | -1.9 | -2.7 | -3.6 | -3.5 |

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2.9 | 2.7 | 2.6 | 2.8 | 3.1 | 3.2 | 3.0 | 2.9 | 2.9 | 3.9 | 4.1 | 3.3 | 2.9 | 2.8 | 3.6 | 3.4 | 2.9 | 2.6 | 2.7 | 2.9 | 3.3 | 4.0 | 4.3 | 4.1 | 3.6 | 3.1 | 2.9 | 3.0 | 2.7 | 2.4 | 2.1 | 2.1 | 2.4 | 2.7 | 2.9 | 3.0 |
| 3.1 | 2.8 | 2.7 | 3.2 | 3.4 | 3.2 | 3.6 | 3.2 | 3.2 | 4.7 | 4.4 | 3.8 | 5.0 | 5.1 | 4.3 | 5.3 | 4.1 | 4.5 | 5.3 | 5.0 | 4.4 | 4.4 | 4.4 | 4.7 | 4.5 | 3.3 | 3.4 | 4.0 | 3.8 | 2.7 | 2.3 | 2.3 | 2.2 | 2.8 | 3.7 | 3.5 |
| 3.7 | 4.8 | 6.4 | 6.0 | 5.5 | 4.9 | 3.7 | 3.5 | 3.1 | 4.0 | 4.8 | 5.7 | 8.0 | 9.5 | 7.6 | 7.8 | 7.4 | 7.4 | 7.3 | 7.1 | 5.5 | 5.1 | 4.7 | 4.5 | 4.8 | 4.4 | 4.2 | 4.2 | 3.5 | 2.1 | 2.0 | 2.0 | 2.7 | 3.9 | 5.2 | 3.9 |
| 4.4 | 6.4 | 6.5 | 6.9 | 8.2 | 8.0 | 7.6 | 4.7 | 3.5 | 3.4 | 4.2 | 5.6 | 7.8 | 8.3 | 9.1 | 8.7 | 7.0 | 6.9 | 6.6 | 6.7 | 4.8 | 5.0 | 5.1 | 4.6 | 4.7 | 4.6 | 5.1 | 5.7 | 4.4 | 3.4 | 2.3 | 3.1 | 4.7 | 6.5 | 5.2 | 4.4 |
| 5.9 | 6.7 | 7.1 | 9.0 | 9.8 | 8.3 | 8.4 | 7.7 | 5.4 | 4.5 | 4.3 | 7.5 | 9.1 | 10.3 | 10.6 | 9.4 | 7.2 | 6.7 | 7.0 | 7.3 | 7.3 | 7.8 | 6.5 | 4.9 | 6.0 | 6.9 | 5.6 | 5.0 | 3.3 | 3.2 | 2.9 | 4.2 | 5.2 | 6.2 | 6.1 | 6.3 |
| 6.4 | 6.6 | 8.2 | 10.5 | 9.6 | 7.6 | 4.9 | 5.0 | 3.9 | 4.3 | 6.9 | 7.5 | 9.7 | 10.9 | 9.5 | 6.9 | 4.6 | 4.9 | 6.1 | 5.9 | 6.8 | 8.1 | 6.1 | 7.5 | 8.4 | 8.3 | 8.1 | 7.6 | 7.0 | 5.6 | 4.5 | 4.9 | 5.6 | 5.7 | 4.7 | 5.2 |
| 2.0 | 2.9 | 5.1 | 7.7 | 7.5 | 4.7 | 4.8 | 5.8 | 4.8 | 4.4 | 5.1 | 6.1 | 6.3 | 5.8 | 3.5 | 2.8 | 3.5 | 5.4 | 6.6 | 6.3 | 4.7 | 4.3 | 4.7 | 4.3 | 5.1 | 3.5 | 4.8 | 5.0 | 4.6 | 3.4 | 2.7 | 2.1 | 2.5 | 3.2 | 2.8 | 2.4 |
| 5.9 | 3.7 | 2.5 | 2.4 | 3.0 | 6.4 | 7.3 | 6.4 | 3.5 | 2.8 | 1.9 | 1.9 | 1.3 | 1.2 | 2.1 | 3.8 | 5.3 | 7.7 | 5.8 | 4.5 | 4.0 | 3.3 | 2.5 | 1.6 | 3.2 | 4.6 | 5.4 | 4.2 | 2.9 | 3.0 | 4.6 | 4.9 | 7.3 | 8.0 | 6.1 | 7.8 |
| 9.7 | 9.6 | 8.7 | 7.9 | 7.0 | 8.3 | 8.4 | 8.8 | 7.6 | 5.8 | 5.9 | 3.7 | 2.6 | 4.2 | 5.0 | 6.4 | 7.9 | 7.2 | 8.4 | 6.9 | 9.9 | 4.3 | 2.0 | 3.0 | 6.9 | 7.4 | 9.1 | 9.3 | 9.3 | 9.6 | 6.6 | 7.1 | 9.5 | 10.1 | 10.5 | 10.6 |
| 9.4 | 7.3 | 5.0 | 4.0 | 3.1 | 1.8 | 1.5 | 1.2 | 1.5 | 2.6 | 8.5 | 8.3 | 8.8 | 9.0 | 7.3 | 5.7 | 4.4 | 2.6 | 6.7 | 10.5 | 10.3 | 7.1 | 5.0 | 9.1 | 10.2 | 11.7 | 10.9 | 10.9 | 10.4 | 12.2 | 10.5 | 11.9 | 11.1 | 11.8 | 13.1 | 12.9 |
| 7.2 | 7.9 | 7.6 | 8.4 | 6.4 | 2.8 | 2.4 | 2.1 | 2.0 | 1.7 | 6.4 | 10.2 | 10.7 | 8.8 | 4.9 | 2.4 | 2.8 | 1.9 | 2.6 | 10.0 | 10.7 | 10.6 | 11.3 | 9.3 | 8.4 | 9.5 | 6.9 | 4.8 | 2.8 | 6.3 | 11.5 | 8.7 | 6.8 | 4.7 | 6.2 | 9.2 |
| 6.0 | 5.7 | 5.5 | 10.0 | 9.2 | 6.1 | 4.4 | 3.7 | 2.4 | 1.7 | 2.0 | 9.0 | 9.7 | 8.3 | 8.7 | 6.6 | 4.0 | 3.0 | 2.8 | 5.0 | 8.8 | 8.1 | 9.1 | 7.0 | 7.7 | 5.4 | 3.9 | 2.9 | 2.8 | 5.1 | 4.8 | 3.9 | 4.8 | 8.7 | 3.5 | 4.7 |
| 5.4 | 5.9 | 6.0 | 7.4 | 7.0 | 6.7 | 6.1 | 5.6 | 3.5 | 2.2 | 2.5 | 8.6 | 8.5 | 6.2 | 7.7 | 8.4 | 7.2 | 5.5 | 4.3 | 4.4 | 5.6 | 7.0 | 6.4 | 6.9 | 6.3 | 5.5 | 5.1 | 4.3 | 4.1 | 4.0 | 4.2 | 4.0 | 3.4 | 4.8 | 4.2 | 5.7 |
| 5.3 | 5.6 | 5.5 | 6.1 | 5.5 | 5.2 | 5.5 | 5.1 | 5.0 | 4.3 | 6.1 | 7.2 | 6.2 | 7.2 | 5.9 | 6.0 | 6.2 | 5.9 | 5.4 | 4.7 | 5.1 | 5.9 | 6.9 | 7.1 | 6.6 | 5.5 | 4.7 | 4.2 | 5.2 | 4.8 | 5.3 | 5.1 | 5.1 | 5.5 | 4.9 | 6.0 |
| 4.5 | 4.4 | 4.7 | 4.4 | 4.9 | 4.7 | 4.2 | 4.3 | 4.4 | 4.4 | 5.5 | 5.4 | 4.3 | 4.8 | 5.1 | 5.1 | 5.0 | 4.2 | 3.4 | 3.2 | 3.7 | 4.7 | 4.5 | 5.4 | 5.2 | 5.2 | 4.0 | 3.4 | 3.5 | 4.0 | 4.3 | 4.9 | 5.0 | 4.7 | 4.9 | 4.8 |
| 3.1 | 3.2 | 3.7 | 3.6 | 3.8 | 4.0 | 3.4 | 3.1 | 3.0 | 3.5 | 3.6 | 3.7 | 3.3 | 3.4 | 3.4 | 3.5 | 3.5 | 3.0 | 2.7 | 2.8 | 3.0 | 3.2 | 3.5 | 3.9 | 3.9 | 4.0 | 3.4 | 3.1 | 3.0 | 2.9 | 3.1 | 3.2 | 3.8 | 3.8 | 4.2 | 3.8 |
| 3.0 | 3.2 | 3.4 | 3.9 | 3.9 | 3.9 | 3.7 | 3.3 | 3.2 | 3.1 | 3.6 | 4.0 | 3.3 | 3.1 | 2.8 | 2.5 | 2.5 | 2.2 | 2.1 | 2.2 | 2.1 | 2.0 | 2.1 | 1.9 | 2.3 | 2.3 | 1.9 | 1.9 | 1.7 | 1.9 | 2.2 | 2.1 | 2.4 | 2.9 | 3.9 | 3.1 |
| 3.3 | 3.0 | 3.1 | 3.2 | 3.7 | 3.4 | 3.3 | 2.7 | 2.5 | 2.4 | 2.4 | 2.5 | 2.3 | 2.2 | 2.2 | 2.1 | 1.7 | 1.4 | 1.1 | 1.0 | 1.0 | 1.0 | 1.2 | 1.5 | 1.5 | 1.6 | 1.5 | 1.3 | 1.2 | 1.3 | 1.4 | 1.8 | 2.1 | 3.3 | 3.6 | 3.4 |

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

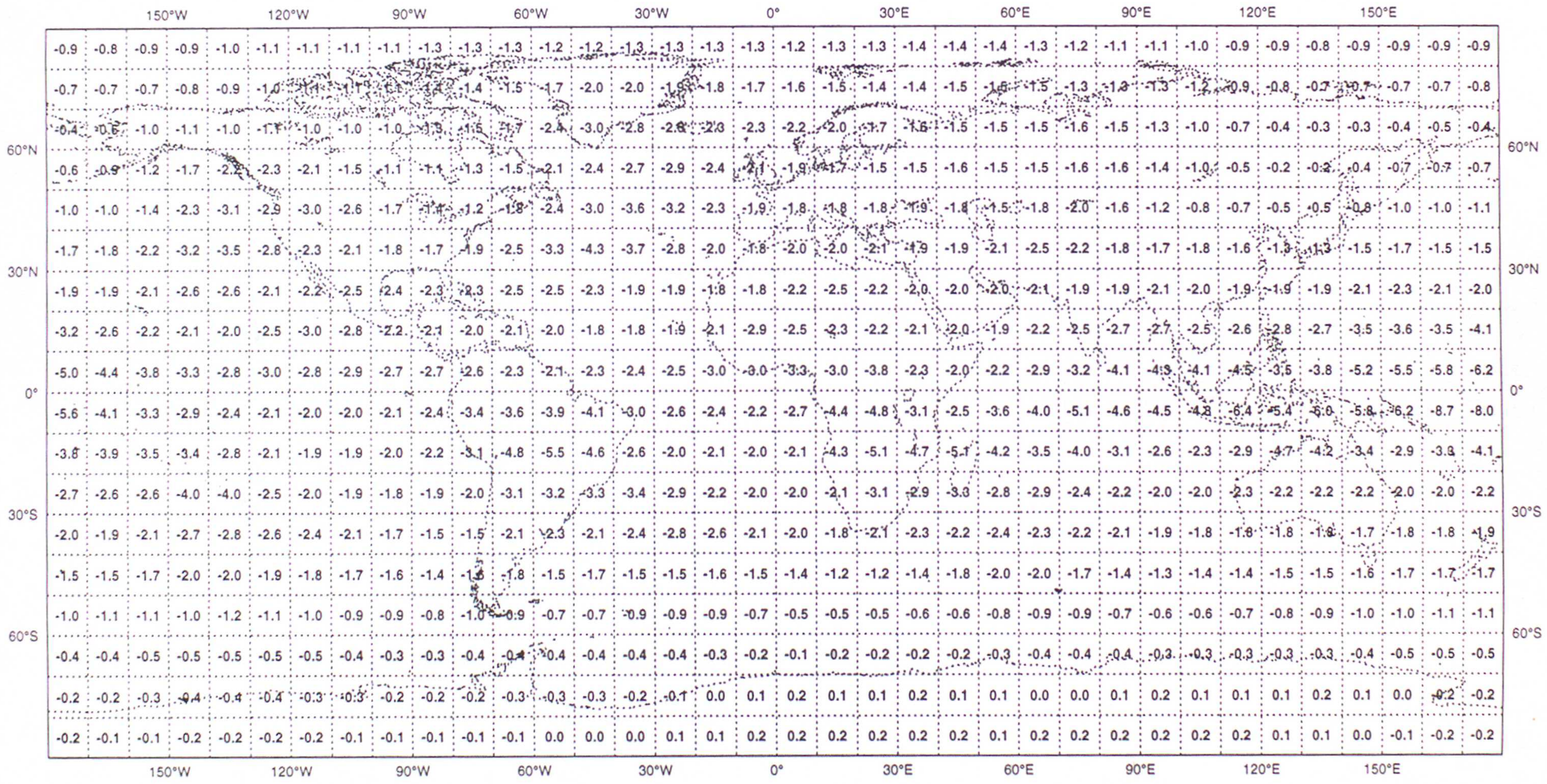
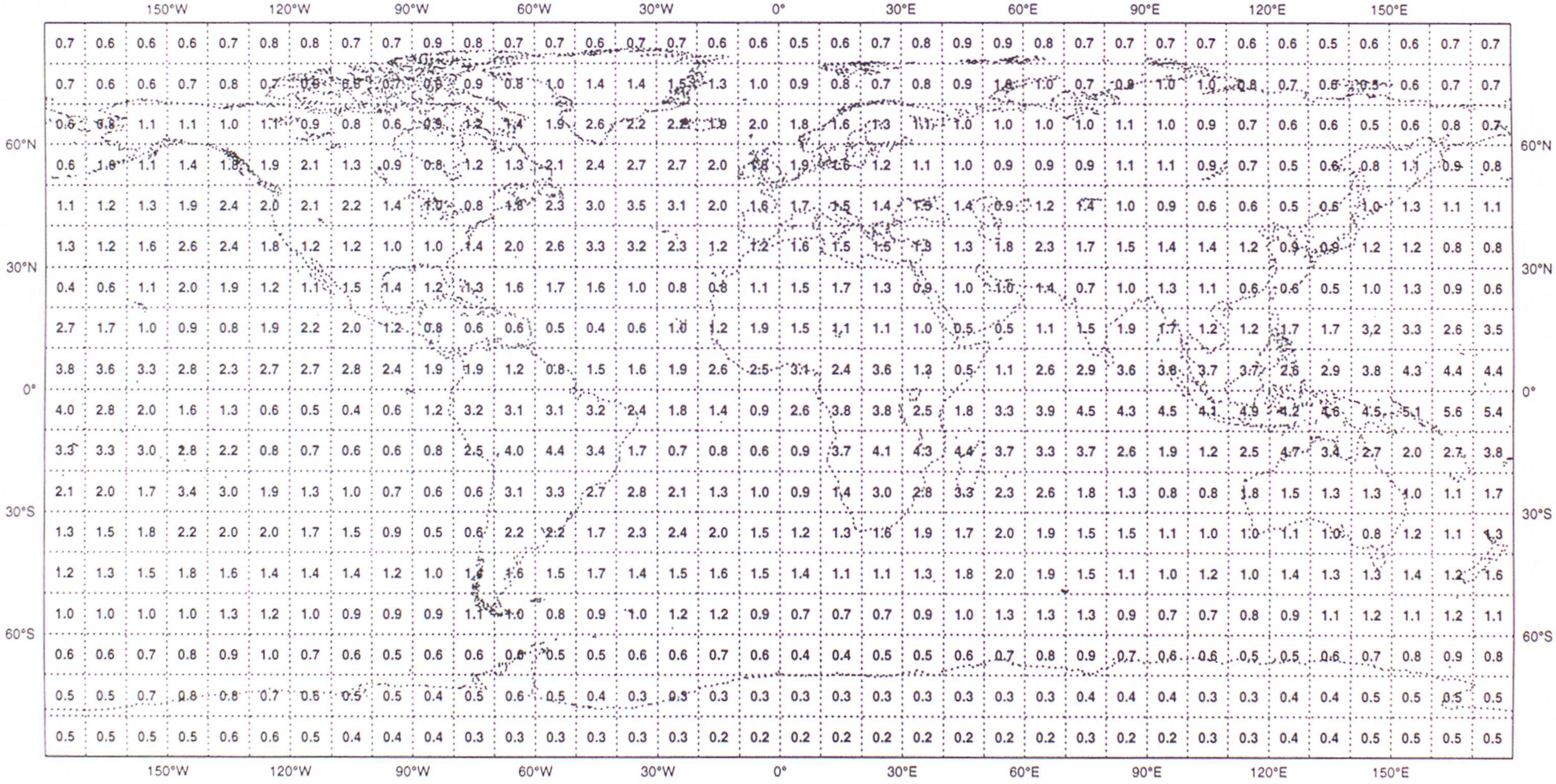
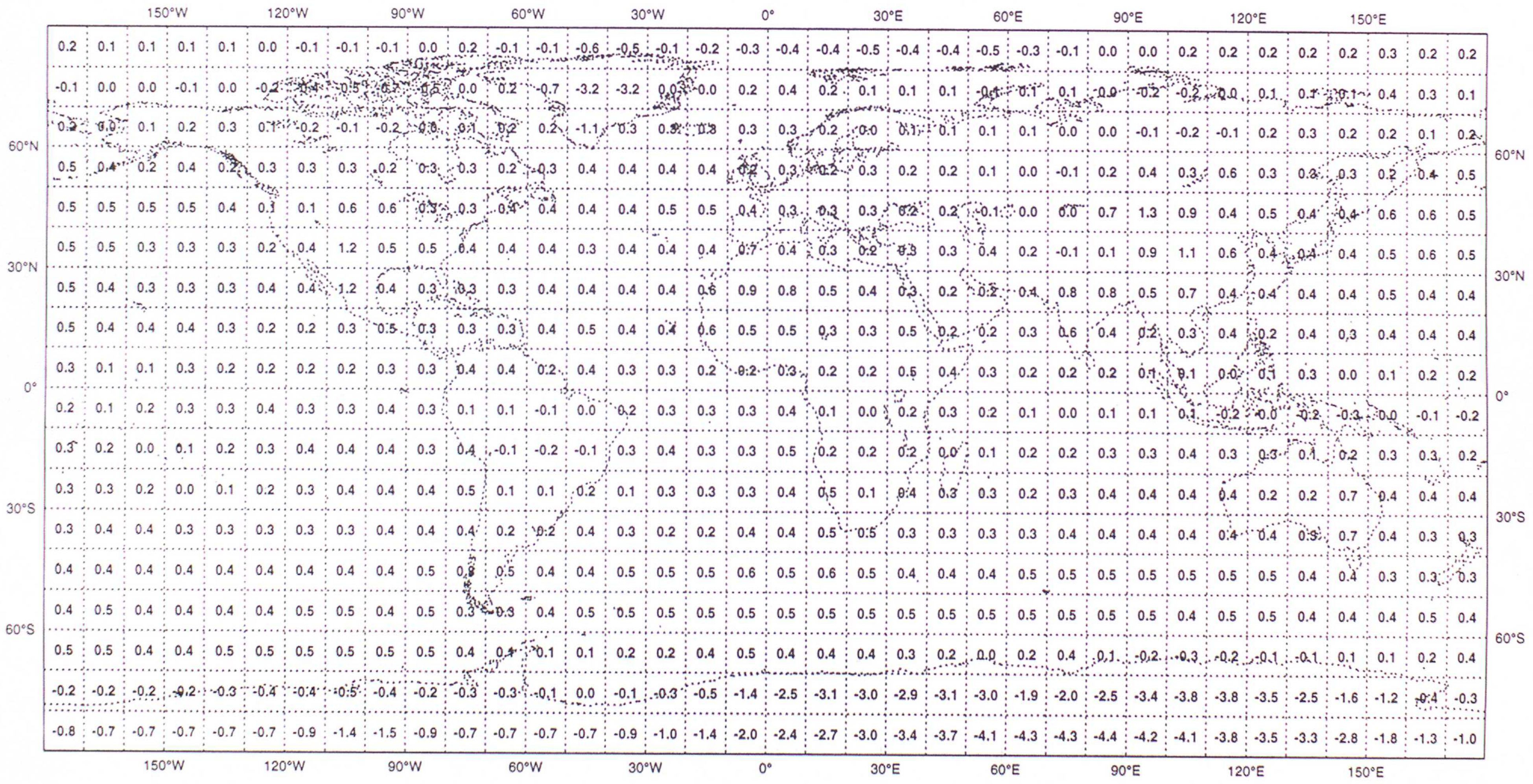

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.9 -0.8 -0.9 -0.9 -1.0 -1.1 -1.1 -1.1 -1.1 -1.3 -1.3 -1.3 -1.2 -1.2 -1.3 -1.3 -1.3 -1.3 -1.2 -1.3 -1.3 -1.4 -1.4 -1.4 -1.3 -1.2 -1.1 -1.1 -1.0 -0.9 -0.9 -0.8 -0.9 -0.9 -0.9 -0.9
-0.7 -0.7 -0.7 -0.8 -0.9 -1.0 -1.1 -1.1 -1.1 -1.4 -1.4 -1.5 -1.7 -2.0 -2.0 -1.9 -1.8 -1.7 -1.6 -1.5 -1.4 -1.4 -1.5 -1.6 -1.5 -1.3 -1.3 -1.3 -1.2 -0.9 -0.8 -0.7 -0.7 -0.7 -0.7 -0.8
-0.4 -0.6 -1.0 -1.1 -1.0 -1.1 -1.0 -1.0 -1.0 -1.3 -1.5 -1.7 -2.4 -3.0 -2.8 -2.8 -2.3 -2.3 -2.2 -2.0 -1.7 -1.6 -1.5 -1.5 -1.5 -1.6 -1.5 -1.3 -1.0 -0.7 -0.4 -0.3 -0.3 -0.4 -0.5 -0.4
-0.6 -0.9 -1.2 -1.7 -2.2 -2.3 -2.1 -1.5 -1.1 -1.1 -1.3 -1.5 -2.1 -2.4 -2.7 -2.9 -2.4 -2.1 -1.9 -1.7 -1.5 -1.5 -1.6 -1.5 -1.5 -1.6 -1.6 -1.4 -1.0 -0.5 -0.2 -0.2 -0.4 -0.7 -0.7 -0.7
-1.0 -1.0 -1.4 -2.3 -3.1 -2.9 -3.0 -2.6 -1.7 -1.4 -1.2 -1.8 -2.4 -3.0 -3.6 -3.2 -2.3 -1.9 -1.8 -1.8 -1.8 -1.9 -1.8 -1.5 -1.8 -2.0 -1.6 -1.2 -0.8 -0.7 -0.5 -0.5 -0.8 -1.0 -1.0 -1.1
-1.7 -1.8 -2.2 -3.2 -3.5 -2.8 -2.3 -2.1 -1.8 -1.7 -1.9 -2.5 -3.3 -4.3 -3.7 -2.8 -2.0 -1.8 -2.0 -2.0 -2.1 -1.9 -1.9 -2.1 -2.5 -2.2 -1.8 -1.7 -1.8 -1.6 -1.3 -1.3 -1.5 -1.7 -1.5 -1.5
-1.9 -1.9 -2.1 -2.6 -2.6 -2.1 -2.2 -2.5 -2.4 -2.3 -2.3 -2.5 -2.5 -2.3 -1.9 -1.9 -1.8 -1.8 -2.2 -2.5 -2.2 -2.0 -2.0 -2.0 -2.1 -1.9 -1.9 -2.1 -2.0 -1.9 -1.9 -1.9 -2.1 -2.3 -2.1 -2.0
-3.2 -2.6 -2.2 -2.1 -2.0 -2.5 -3.0 -2.8 -2.2 -2.1 -2.0 -2.1 -2.0 -1.8 -1.8 -1.9 -2.1 -2.9 -2.5 -2.3 -2.2 -2.1 -2.0 -1.9 -2.2 -2.5 -2.7 -2.7 -2.5 -2.6 -2.8 -2.7 -3.5 -3.6 -3.5 -4.1
-5.0 -4.4 -3.8 -3.3 -2.8 -3.0 -2.8 -2.9 -2.7 -2.7 -2.6 -2.3 -2.1 -2.3 -2.4 -2.5 -3.0 -3.0 -3.3 -3.0 -3.8 -2.3 -2.0 -2.2 -2.9 -3.2 -4.1 -4.3 -4.1 -4.5 -3.5 -3.8 -5.2 -5.5 -5.8 -6.2
-5.6 -4.1 -3.3 -2.9 -2.4 -2.1 -2.0 -2.0 -2.1 -2.4 -3.4 -3.6 -3.9 -4.1 -3.0 -2.6 -2.4 -2.2 -2.7 -4.4 -4.8 -3.1 -2.5 -3.6 -4.0 -5.1 -4.6 -4.5 -4.8 -6.4 -5.4 -6.0 -5.8 -6.2 -8.7 -8.0
-3.8 -3.9 -3.5 -3.4 -2.8 -2.1 -1.9 -1.9 -2.0 -2.2 -3.1 -4.8 -5.5 -4.6 -2.6 -2.0 -2.1 -2.0 -2.1 -4.3 -5.1 -4.7 -5.1 -4.2 -3.5 -4.0 -3.1 -2.6 -2.3 -2.9 -4.7 -4.2 -3.4 -2.9 -3.3 -4.1
-2.7 -2.6 -2.6 -4.0 -4.0 -2.5 -2.0 -1.9 -1.8 -1.9 -2.0 -3.1 -3.2 -3.3 -3.4 -2.9 -2.2 -2.0 -2.0 -2.1 -3.1 -2.9 -3.3 -2.8 -2.9 -2.4 -2.2 -2.0 -2.0 -2.3 -2.2 -2.2 -2.2 -2.0 -2.0 -2.2
-2.0 -1.9 -2.1 -2.7 -2.8 -2.6 -2.4 -2.1 -1.7 -1.5 -1.5 -2.1 -2.3 -2.1 -2.4 -2.8 -2.6 -2.1 -2.0 -1.8 -2.1 -2.3 -2.2 -2.4 -2.3 -2.2 -2.1 -1.9 -1.8 -1.8 -1.8 -1.8 -1.7 -1.8 -1.8 -1.9
-1.5 -1.5 -1.7 -2.0 -2.0 -1.9 -1.8 -1.7 -1.6 -1.4 -1.5 -1.8 -1.5 -1.7 -1.5 -1.5 -1.6 -1.5 -1.4 -1.2 -1.2 -1.4 -1.8 -2.0 -2.0 -1.7 -1.4 -1.3 -1.4 -1.4 -1.5 -1.5 -1.6 -1.7 -1.7 -1.7
-1.0 -1.1 -1.1 -1.0 -1.2 -1.1 -1.0 -0.9 -0.9 -0.8 -1.0 -0.9 -0.7 -0.7 -0.9 -0.9 -0.9 -0.7 -0.5 -0.5 -0.5 -0.6 -0.6 -0.8 -0.9 -0.9 -0.7 -0.6 -0.6 -0.7 -0.8 -0.9 -1.0 -1.0 -1.1 -1.1
-0.4 -0.4 -0.5 -0.5 -0.5 -0.5 -0.5 -0.4 -0.3 -0.3 -0.4 -0.4 -0.4 -0.4 -0.4 -0.4 -0.3 -0.2 -0.1 -0.2 -0.2 -0.2 -0.2 -0.3 -0.4 -0.4 -0.4 -0.3 -0.3 -0.3 -0.3 -0.3 -0.4 -0.5 -0.5 -0.5
-0.2 -0.2 -0.3 -0.4 -0.4 -0.4 -0.3 -0.3 -0.2 -0.2 -0.2 -0.3 -0.3 -0.3 -0.2 -0.1 0.0 0.1 0.2 0.1 0.1 0.2 0.1 0.1 0.0 0.0 0.1 0.2 0.1 0.1 0.1 0.2 0.1 0.0 -0.2 -0.2
-0.2 -0.1 -0.1 -0.2 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.0 -0.1 -0.2 -0.2

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations



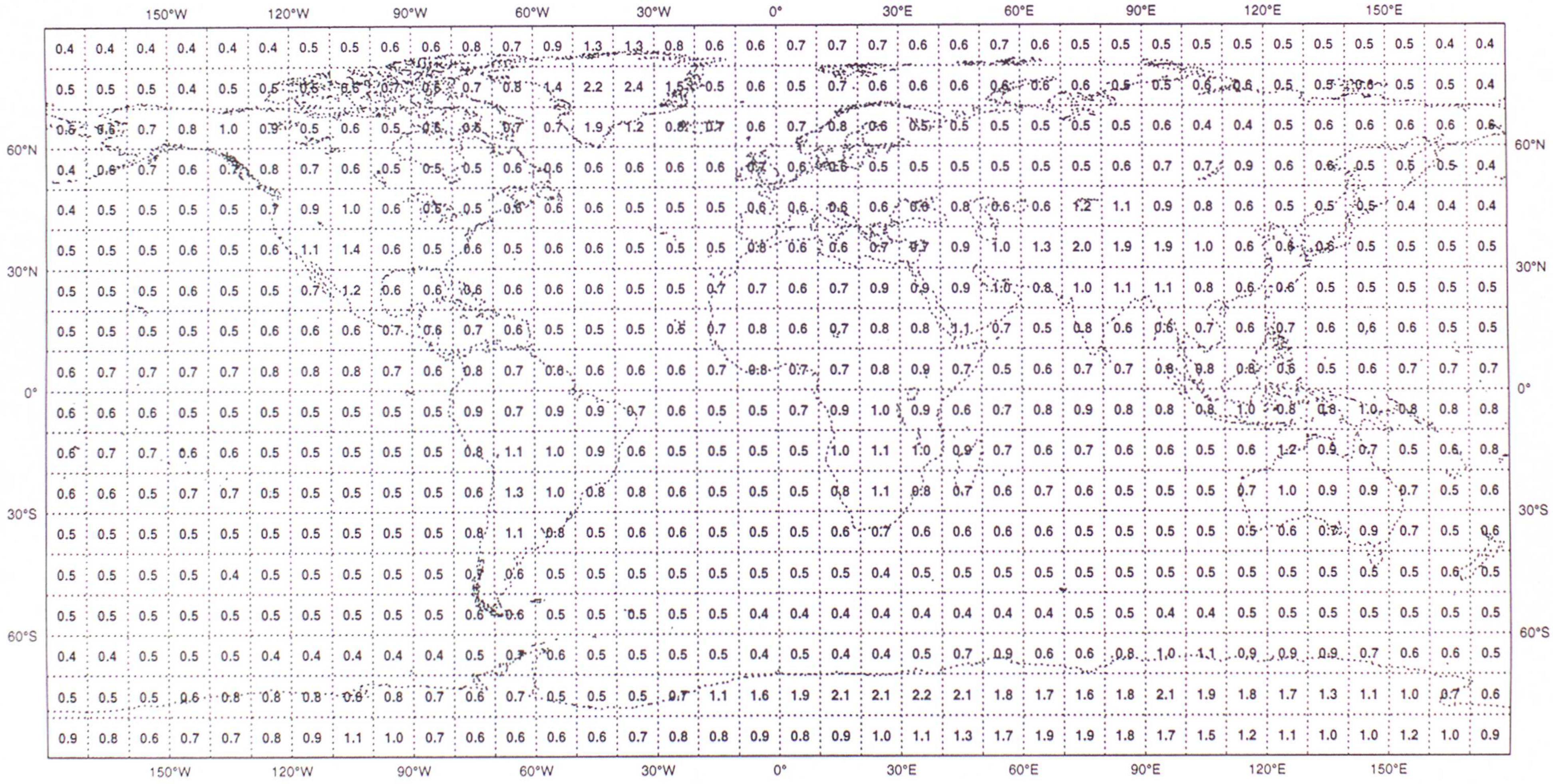
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.7 | 0.6 | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.7 | 0.7 | 0.9 | 0.8 | 0.7 | 0.7 | 0.6 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.9 | 0.8 | 0.7 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 |
| 0.7 | 0.6 | 0.6 | 0.7 | 0.8 | 0.7 | 0.9 | 0.8 | 0.7 | 0.9 | 0.9 | 0.8 | 1.0 | 1.4 | 1.4 | 1.5 | 1.3 | 1.0 | 0.9 | 0.8 | 0.7 | 0.8 | 0.9 | 1.8 | 1.0 | 0.7 | 0.9 | 1.0 | 1.0 | 0.8 | 0.7 | 0.6 | 0.5 | 0.6 | 0.7 | 0.7 |
| 0.6 | 0.8 | 1.1 | 1.1 | 1.0 | 1.1 | 0.9 | 0.8 | 0.6 | 0.9 | 1.2 | 1.4 | 1.9 | 2.6 | 2.2 | 2.2 | 1.9 | 2.0 | 1.8 | 1.6 | 1.3 | 1.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.1 | 1.0 | 0.9 | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 0.8 | 0.7 |
| 0.6 | 1.8 | 1.1 | 1.4 | 1.8 | 1.9 | 2.1 | 1.3 | 0.9 | 0.8 | 1.2 | 1.3 | 2.1 | 2.4 | 2.7 | 2.7 | 2.0 | 1.8 | 1.9 | 1.6 | 1.2 | 1.1 | 1.0 | 0.9 | 0.9 | 0.9 | 1.1 | 1.1 | 0.9 | 0.7 | 0.5 | 0.6 | 0.8 | 1.1 | 0.9 | 0.8 |
| 1.1 | 1.2 | 1.3 | 1.9 | 2.4 | 2.0 | 2.1 | 2.2 | 1.4 | 1.0 | 0.8 | 1.8 | 2.3 | 3.0 | 3.5 | 3.1 | 2.0 | 1.6 | 1.7 | 1.5 | 1.4 | 1.5 | 1.4 | 0.9 | 1.2 | 1.4 | 1.0 | 0.9 | 0.6 | 0.6 | 0.5 | 0.6 | 1.0 | 1.3 | 1.1 | 1.1 |
| 1.3 | 1.2 | 1.6 | 2.6 | 2.4 | 1.8 | 1.2 | 1.2 | 1.0 | 1.0 | 1.4 | 2.0 | 2.6 | 3.3 | 3.2 | 2.3 | 1.2 | 1.2 | 1.6 | 1.5 | 1.5 | 1.3 | 1.3 | 1.8 | 2.3 | 1.7 | 1.5 | 1.4 | 1.4 | 1.2 | 0.9 | 0.9 | 1.2 | 1.2 | 0.8 | 0.8 |
| 0.4 | 0.6 | 1.1 | 2.0 | 1.9 | 1.2 | 1.1 | 1.5 | 1.4 | 1.2 | 1.3 | 1.6 | 1.7 | 1.6 | 1.0 | 0.8 | 0.8 | 1.1 | 1.5 | 1.7 | 1.3 | 0.9 | 1.0 | 1.0 | 1.4 | 0.7 | 1.0 | 1.3 | 1.1 | 0.6 | 0.6 | 0.5 | 1.0 | 1.3 | 0.9 | 0.6 |
| 2.7 | 1.7 | 1.0 | 0.9 | 0.8 | 1.9 | 2.2 | 2.0 | 1.2 | 0.8 | 0.6 | 0.6 | 0.5 | 0.4 | 0.6 | 1.0 | 1.2 | 1.9 | 1.5 | 1.1 | 1.1 | 1.0 | 0.5 | 0.5 | 1.1 | 1.5 | 1.9 | 1.7 | 1.2 | 1.2 | 1.7 | 1.7 | 3.2 | 3.3 | 2.6 | 3.5 |
| 3.8 | 3.6 | 3.3 | 2.8 | 2.3 | 2.7 | 2.7 | 2.8 | 2.4 | 1.9 | 1.9 | 1.2 | 0.8 | 1.5 | 1.6 | 1.9 | 2.6 | 2.5 | 3.1 | 2.4 | 3.6 | 1.3 | 0.5 | 1.1 | 2.6 | 2.9 | 3.6 | 3.8 | 3.7 | 3.7 | 2.6 | 2.9 | 3.8 | 4.3 | 4.4 | 4.4 |
| 4.0 | 2.8 | 2.0 | 1.6 | 1.3 | 0.6 | 0.5 | 0.4 | 0.6 | 1.2 | 3.2 | 3.1 | 3.1 | 3.2 | 2.4 | 1.8 | 1.4 | 0.9 | 2.6 | 3.8 | 3.8 | 2.5 | 1.8 | 3.3 | 3.9 | 4.5 | 4.3 | 4.5 | 4.1 | 4.9 | 4.2 | 4.6 | 4.5 | 5.1 | 5.6 | 5.4 |
| 3.3 | 3.3 | 3.0 | 2.8 | 2.2 | 0.8 | 0.7 | 0.6 | 0.6 | 0.8 | 2.5 | 4.0 | 4.4 | 3.4 | 1.7 | 0.7 | 0.8 | 0.6 | 0.9 | 3.7 | 4.1 | 4.3 | 4.4 | 3.7 | 3.3 | 3.7 | 2.6 | 1.9 | 1.2 | 2.5 | 4.7 | 3.4 | 2.7 | 2.0 | 2.7 | 3.8 |
| 2.1 | 2.0 | 1.7 | 3.4 | 3.0 | 1.9 | 1.3 | 1.0 | 0.7 | 0.6 | 0.6 | 3.1 | 3.3 | 2.7 | 2.8 | 2.1 | 1.3 | 1.0 | 0.9 | 1.4 | 3.0 | 2.8 | 3.3 | 2.3 | 2.6 | 1.8 | 1.3 | 0.8 | 0.8 | 1.8 | 1.5 | 1.3 | 1.3 | 1.0 | 1.1 | 1.7 |
| 1.3 | 1.5 | 1.8 | 2.2 | 2.0 | 2.0 | 1.7 | 1.5 | 0.9 | 0.5 | 0.6 | 2.2 | 2.2 | 1.7 | 2.3 | 2.4 | 2.0 | 1.5 | 1.2 | 1.3 | 1.6 | 1.9 | 1.7 | 2.0 | 1.9 | 1.5 | 1.5 | 1.1 | 1.0 | 1.0 | 1.1 | 1.0 | 0.8 | 1.2 | 1.1 | 1.3 |
| 1.2 | 1.3 | 1.5 | 1.8 | 1.6 | 1.4 | 1.4 | 1.4 | 1.2 | 1.0 | 1.6 | 1.6 | 1.5 | 1.7 | 1.4 | 1.5 | 1.6 | 1.5 | 1.4 | 1.1 | 1.1 | 1.3 | 1.8 | 2.0 | 1.9 | 1.5 | 1.1 | 1.0 | 1.2 | 1.0 | 1.4 | 1.3 | 1.3 | 1.4 | 1.2 | 1.6 |
| 1.0 | 1.0 | 1.0 | 1.0 | 1.3 | 1.2 | 1.0 | 0.9 | 0.9 | 0.9 | 1.1 | 1.0 | 0.8 | 0.9 | 1.0 | 1.2 | 1.2 | 0.9 | 0.7 | 0.7 | 0.7 | 0.9 | 1.0 | 1.3 | 1.3 | 1.3 | 0.9 | 0.7 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 1.1 | 1.2 | 1.1 |
| 0.6 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 0.7 | 0.6 | 0.5 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.6 | 0.6 | 0.7 | 0.6 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.8 |
| 0.5 | 0.5 | 0.7 | 0.8 | 0.8 | 0.7 | 0.6 | 0.5 | 0.5 | 0.4 | 0.5 | 0.6 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 |

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations



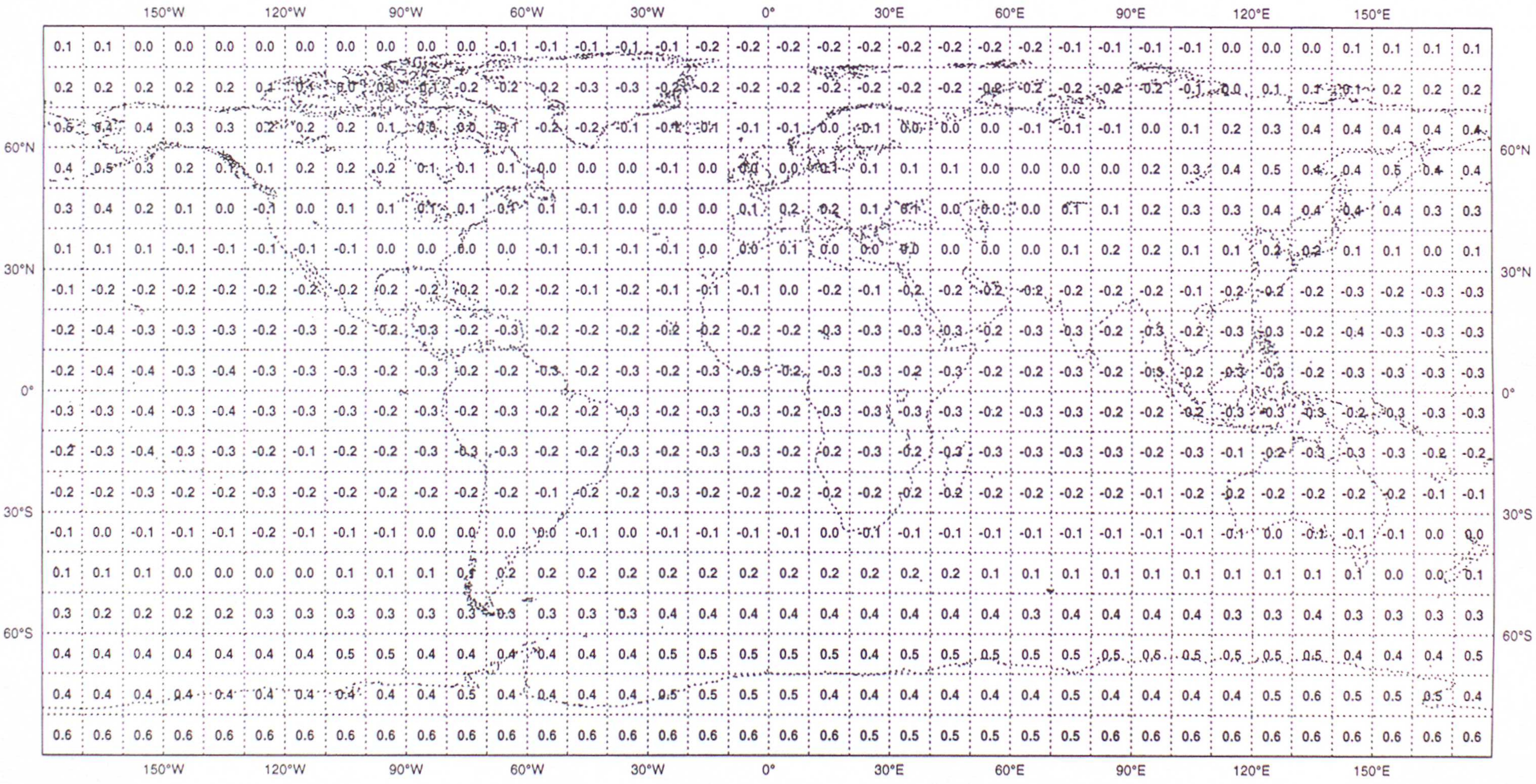
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | 0.2 | -0.1 | -0.1 | -0.6 | -0.5 | -0.1 | -0.2 | -0.3 | -0.4 | -0.4 | -0.5 | -0.4 | -0.4 | -0.5 | -0.3 | -0.1 | 0.0 | 0.0 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 |
| -0.1 | 0.0 | 0.0 | -0.1 | 0.0 | -0.2 | -0.4 | -0.5 | -0.7 | -0.5 | 0.0 | 0.2 | -0.7 | -3.2 | -3.2 | 0.0 | -0.0 | 0.2 | 0.4 | 0.2 | 0.1 | 0.1 | 0.1 | -0.1 | 0.1 | 0.1 | 0.0 | -0.2 | -0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.4 | 0.3 | 0.1 |
| 0.2 | 0.0 | 0.1 | 0.2 | 0.3 | 0.1 | -0.2 | -0.1 | -0.2 | 0.0 | 0.1 | 0.2 | 0.2 | -1.1 | 0.3 | 0.3 | 0.8 | 0.3 | 0.3 | 0.2 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | -0.1 | -0.2 | -0.1 | 0.2 | 0.3 | 0.2 | 0.2 | 0.1 | 0.2 |
| 0.5 | 0.4 | 0.2 | 0.4 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 | 0.3 | 0.3 | 0.2 | -0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.3 | 0.2 | 0.3 | 0.2 | 0.2 | 0.1 | 0.0 | -0.1 | 0.2 | 0.4 | 0.3 | 0.6 | 0.3 | 0.3 | 0.3 | 0.2 | 0.4 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.1 | 0.1 | 0.6 | 0.6 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.2 | 0.2 | -0.1 | 0.0 | 0.0 | 0.7 | 1.3 | 0.9 | 0.4 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.5 |
| 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.2 | 0.4 | 1.2 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.7 | 0.4 | 0.3 | 0.2 | 0.3 | 0.3 | 0.4 | 0.2 | -0.1 | 0.1 | 0.9 | 1.1 | 0.6 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.5 |
| 0.5 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 1.2 | 0.4 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.6 | 0.9 | 0.8 | 0.5 | 0.4 | 0.3 | 0.2 | 0.2 | 0.4 | 0.8 | 0.8 | 0.5 | 0.7 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 |
| 0.5 | 0.4 | 0.4 | 0.4 | 0.3 | 0.2 | 0.2 | 0.3 | 0.5 | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 | 0.6 | 0.5 | 0.5 | 0.3 | 0.3 | 0.5 | 0.2 | 0.2 | 0.3 | 0.6 | 0.4 | 0.2 | 0.3 | 0.4 | 0.2 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 |
| 0.3 | 0.1 | 0.1 | 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.2 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.3 | 0.2 | 0.2 | 0.5 | 0.4 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 | 0.3 | 0.0 | 0.1 | 0.2 | 0.2 |
| 0.2 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.1 | 0.1 | -0.1 | 0.0 | 0.2 | 0.3 | 0.3 | 0.3 | 0.4 | 0.1 | 0.0 | 0.2 | 0.3 | 0.2 | 0.1 | 0.0 | 0.1 | 0.1 | 0.1 | -0.2 | 0.0 | -0.2 | -0.3 | 0.0 | -0.1 | -0.2 |
| 0.3 | 0.2 | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | -0.1 | -0.2 | -0.1 | 0.3 | 0.4 | 0.3 | 0.3 | 0.5 | 0.2 | 0.2 | 0.2 | 0.0 | 0.1 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.1 | 0.2 | 0.3 | 0.3 | 0.2 |
| 0.3 | 0.3 | 0.2 | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | 0.1 | 0.1 | 0.2 | 0.1 | 0.3 | 0.3 | 0.3 | 0.4 | 0.5 | 0.1 | 0.4 | 0.3 | 0.3 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.2 | 0.2 | 0.7 | 0.4 | 0.4 | 0.4 |
| 0.3 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.2 | 0.2 | 0.4 | 0.3 | 0.2 | 0.2 | 0.4 | 0.4 | 0.5 | 0.5 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.7 | 0.4 | 0.3 | 0.3 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.8 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.3 |
| 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.5 | 0.3 | 0.3 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 |
| 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.3 | 0.2 | 0.0 | 0.2 | 0.4 | 0.1 | -0.2 | -0.3 | -0.2 | -0.1 | -0.1 | 0.1 | 0.1 | 0.2 | 0.4 |
| -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.4 | -0.4 | -0.5 | -0.4 | -0.2 | -0.3 | -0.3 | -0.1 | 0.0 | -0.1 | -0.3 | -0.5 | -1.4 | -2.5 | -3.1 | -3.0 | -2.9 | -3.1 | -3.0 | -1.9 | -2.0 | -2.5 | -3.4 | -3.8 | -3.8 | -3.5 | -2.5 | -1.6 | -1.2 | -0.4 | -0.3 |
| -0.8 | -0.7 | -0.7 | -0.7 | -0.7 | -0.7 | -0.9 | -1.4 | -1.5 | -0.9 | -0.7 | -0.7 | -0.7 | -0.7 | -0.9 | -1.0 | -1.4 | -2.0 | -2.4 | -2.7 | -3.0 | -3.4 | -3.7 | -4.1 | -4.3 | -4.3 | -4.4 | -4.2 | -4.1 | -3.8 | -3.5 | -3.3 | -2.8 | -1.8 | -1.3 | -1.0 |

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.6 | 0.6 | 0.8 | 0.7 | 0.9 | 1.3 | 1.3 | 0.8 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.6 | 0.6 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 |
| 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 | 0.8 | 1.4 | 2.2 | 2.4 | 1.5 | 0.5 | 0.6 | 0.5 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.4 |
| 0.6 | 0.6 | 0.7 | 0.8 | 1.0 | 0.9 | 0.5 | 0.6 | 0.5 | 0.6 | 0.6 | 0.7 | 0.7 | 1.9 | 1.2 | 0.8 | 0.7 | 0.6 | 0.7 | 0.8 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| 0.4 | 0.6 | 0.7 | 0.6 | 0.7 | 0.8 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.7 | 0.9 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 |
| 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | 0.9 | 1.0 | 0.6 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.8 | 0.6 | 0.6 | 1.2 | 1.1 | 0.9 | 0.8 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 |
| 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.6 | 1.1 | 1.4 | 0.6 | 0.5 | 0.6 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.8 | 0.6 | 0.6 | 0.7 | 0.7 | 0.9 | 1.0 | 1.3 | 2.0 | 1.9 | 1.9 | 1.0 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.7 | 1.2 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.7 | 0.7 | 0.6 | 0.7 | 0.9 | 0.9 | 0.9 | 1.0 | 0.8 | 1.0 | 1.1 | 1.1 | 0.8 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | 0.8 | 0.6 | 0.7 | 0.8 | 0.8 | 1.1 | 0.7 | 0.5 | 0.8 | 0.6 | 0.6 | 0.7 | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 |
| 0.6 | 0.7 | 0.7 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 0.7 | 0.6 | 0.8 | 0.7 | 0.8 | 0.6 | 0.6 | 0.6 | 0.7 | 0.8 | 0.7 | 0.7 | 0.8 | 0.9 | 0.7 | 0.5 | 0.6 | 0.7 | 0.7 | 0.8 | 0.8 | 0.8 | 0.6 | 0.5 | 0.6 | 0.7 | 0.7 | 0.7 |
| 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.9 | 0.7 | 0.9 | 0.9 | 0.7 | 0.6 | 0.5 | 0.5 | 0.7 | 0.9 | 1.0 | 0.9 | 0.6 | 0.7 | 0.8 | 0.9 | 0.8 | 0.8 | 0.8 | 1.0 | 0.8 | 0.8 | 1.0 | 0.8 | 0.8 | 0.8 |
| 0.6 | 0.7 | 0.7 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.8 | 1.1 | 1.0 | 0.9 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 1.0 | 1.1 | 1.0 | 0.9 | 0.7 | 0.6 | 0.7 | 0.6 | 0.6 | 0.5 | 0.6 | 1.2 | 0.9 | 0.7 | 0.5 | 0.6 | 0.8 |
| 0.6 | 0.6 | 0.5 | 0.7 | 0.7 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 1.3 | 1.0 | 0.8 | 0.8 | 0.6 | 0.5 | 0.5 | 0.5 | 0.8 | 1.1 | 0.8 | 0.7 | 0.6 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.7 | 1.0 | 0.9 | 0.9 | 0.7 | 0.5 | 0.6 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.8 | 1.1 | 0.8 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.7 | 0.9 | 0.7 | 0.5 | 0.6 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.7 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.7 | 0.9 | 0.6 | 0.6 | 0.8 | 1.0 | 1.1 | 0.9 | 0.9 | 0.9 | 0.7 | 0.6 | 0.6 | 0.5 |
| 0.5 | 0.5 | 0.5 | 0.6 | 0.8 | 0.8 | 0.8 | 0.6 | 0.8 | 0.7 | 0.6 | 0.7 | 0.5 | 0.5 | 0.5 | 0.7 | 1.1 | 1.6 | 1.9 | 2.1 | 2.1 | 2.2 | 2.1 | 1.8 | 1.7 | 1.6 | 1.8 | 2.1 | 1.9 | 1.8 | 1.7 | 1.3 | 1.1 | 1.0 | 0.7 | 0.6 |
| 0.9 | 0.8 | 0.6 | 0.7 | 0.7 | 0.8 | 0.9 | 1.1 | 1.0 | 0.7 | 0.6 | 0.6 | 0.6 | 0.6 | 0.7 | 0.8 | 0.8 | 0.9 | 0.8 | 0.9 | 1.0 | 1.1 | 1.3 | 1.7 | 1.9 | 1.9 | 1.8 | 1.7 | 1.5 | 1.2 | 1.1 | 1.0 | 1.0 | 1.2 | 1.0 | 0.9 |

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations



| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 | -0.2 | -0.2 | -0.2 | -0.3 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 |
| 0.5 | 0.4 | 0.4 | 0.3 | 0.3 | 0.2 | 0.2 | 0.2 | 0.1 | 0.0 | 0.0 | -0.1 | -0.2 | -0.2 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | 0.1 | 0.2 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 |
| 0.4 | 0.5 | 0.3 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.3 | 0.4 | 0.5 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 |
| 0.3 | 0.4 | 0.2 | 0.1 | 0.0 | -0.1 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 |
| 0.1 | 0.1 | 0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.2 | 0.2 | 0.1 | 0.1 | 0.0 | 0.1 |
| -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 |
| -0.2 | -0.4 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.4 | -0.3 | -0.3 | -0.3 |
| -0.2 | -0.4 | -0.4 | -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 |
| -0.3 | -0.3 | -0.4 | -0.3 | -0.4 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.2 | -0.2 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 |
| -0.2 | -0.3 | -0.4 | -0.3 | -0.3 | -0.2 | -0.1 | -0.2 | -0.2 | -0.3 | -0.3 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.3 | -0.3 | -0.3 | -0.3 | -0.3 | -0.2 | -0.3 | -0.1 | -0.2 | -0.3 | -0.3 | -0.3 | -0.2 | -0.2 |
| -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | -0.3 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.2 | -0.1 | -0.1 |
| -0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.2 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | -0.1 | 0.0 | -0.1 | -0.1 | -0.1 | 0.0 | 0.0 |
| 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.1 |
| 0.3 | 0.2 | 0.2 | 0.2 | 0.2 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.3 | 0.3 | 0.3 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.5 |
| 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.5 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.4 | 0.4 | 0.4 | 0.4 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.4 |
| 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

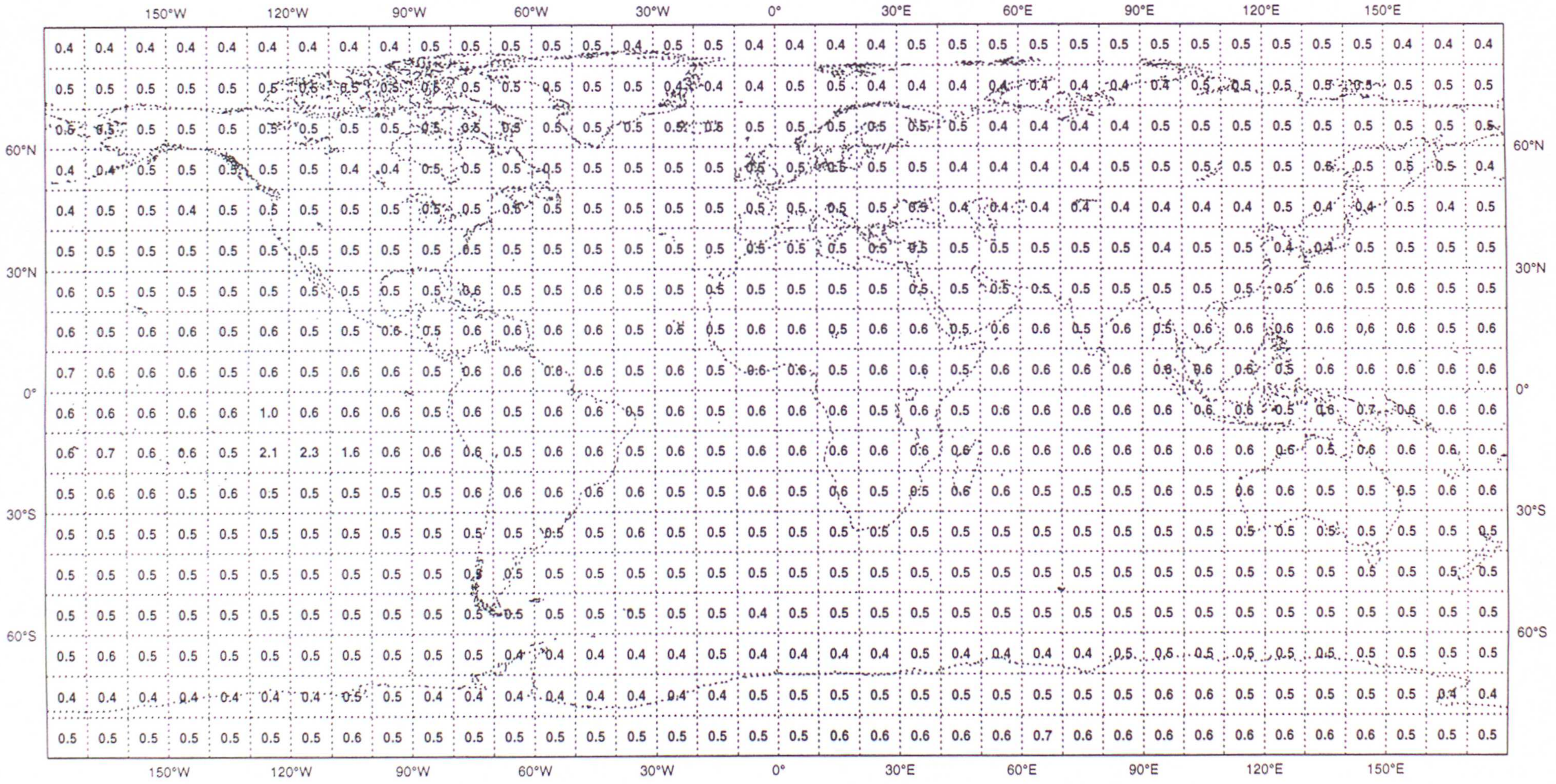

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4
0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.4
0.4 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.4 0.4 0.5 0.4 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.4 0.4 0.5 0.5 0.5 0.5
0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.5 0.5
0.6 0.5 0.6 0.6 0.5 0.6 0.5 0.5 0.6 0.5 0.6 0.6 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.5 0.6 0.6 0.5 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.6
0.7 0.6 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.5 0.6 0.6 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.5 0.6 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.6 0.6 0.6 0.6 0.6
0.6 0.6 0.6 0.6 0.6 1.0 0.6 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.6 0.7 0.6 0.6 0.6
0.6 0.7 0.6 0.6 0.5 2.1 2.3 1.6 0.6 0.6 0.6 0.5 0.6 0.6 0.5 0.6 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.6 0.6 0.6 0.6
0.5 0.6 0.6 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.6 0.5 0.6 0.5 0.5 0.6 0.6 0.5 0.5 0.5 0.6 0.5 0.6 0.6 0.5 0.5 0.5 0.6 0.6
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.5 0.4 0.4 0.4 0.4 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.5 0.5 0.5 0.5 0.5 0.4 0.4
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.6 0.6 0.6 0.6 0.7 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

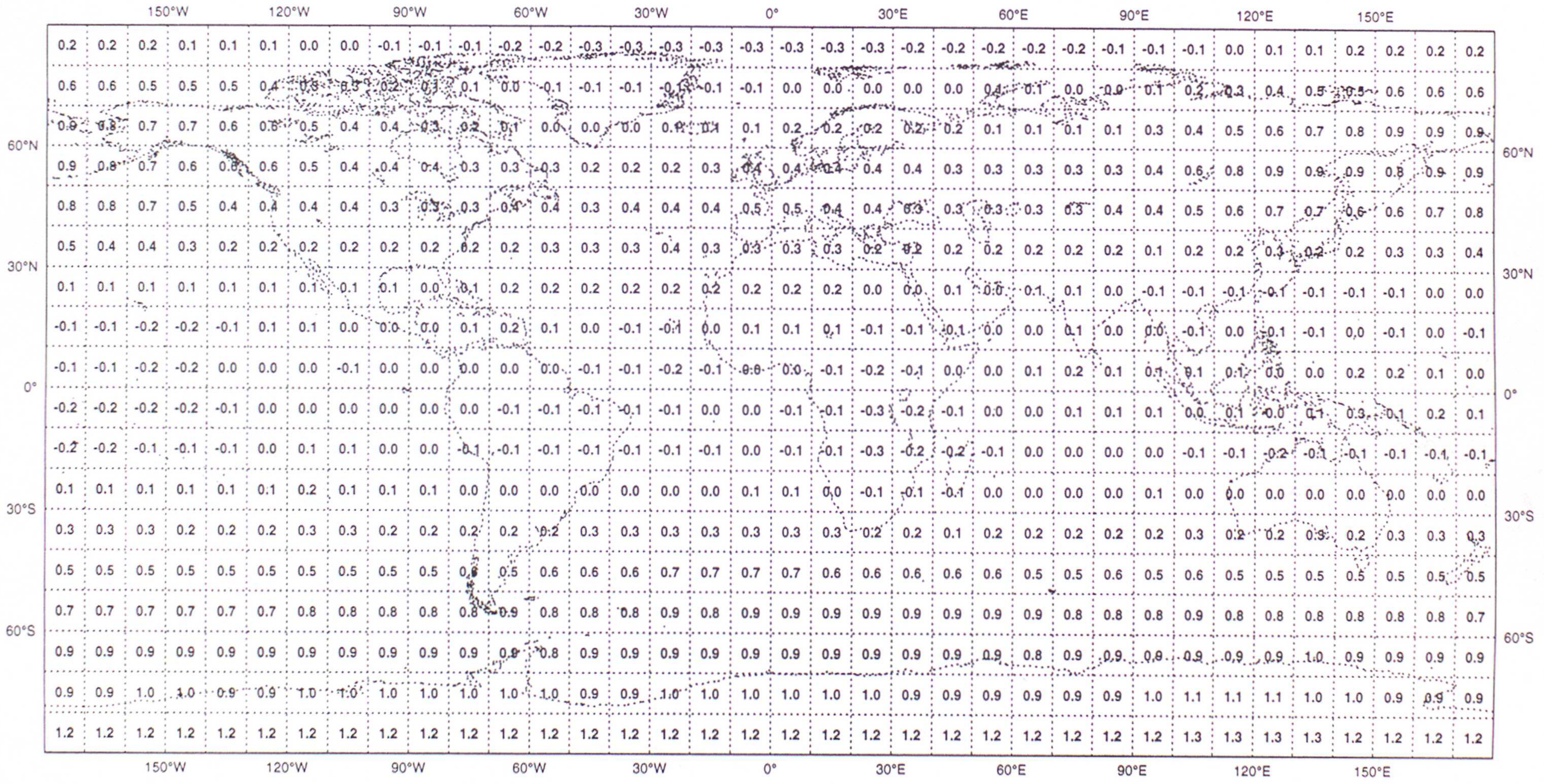
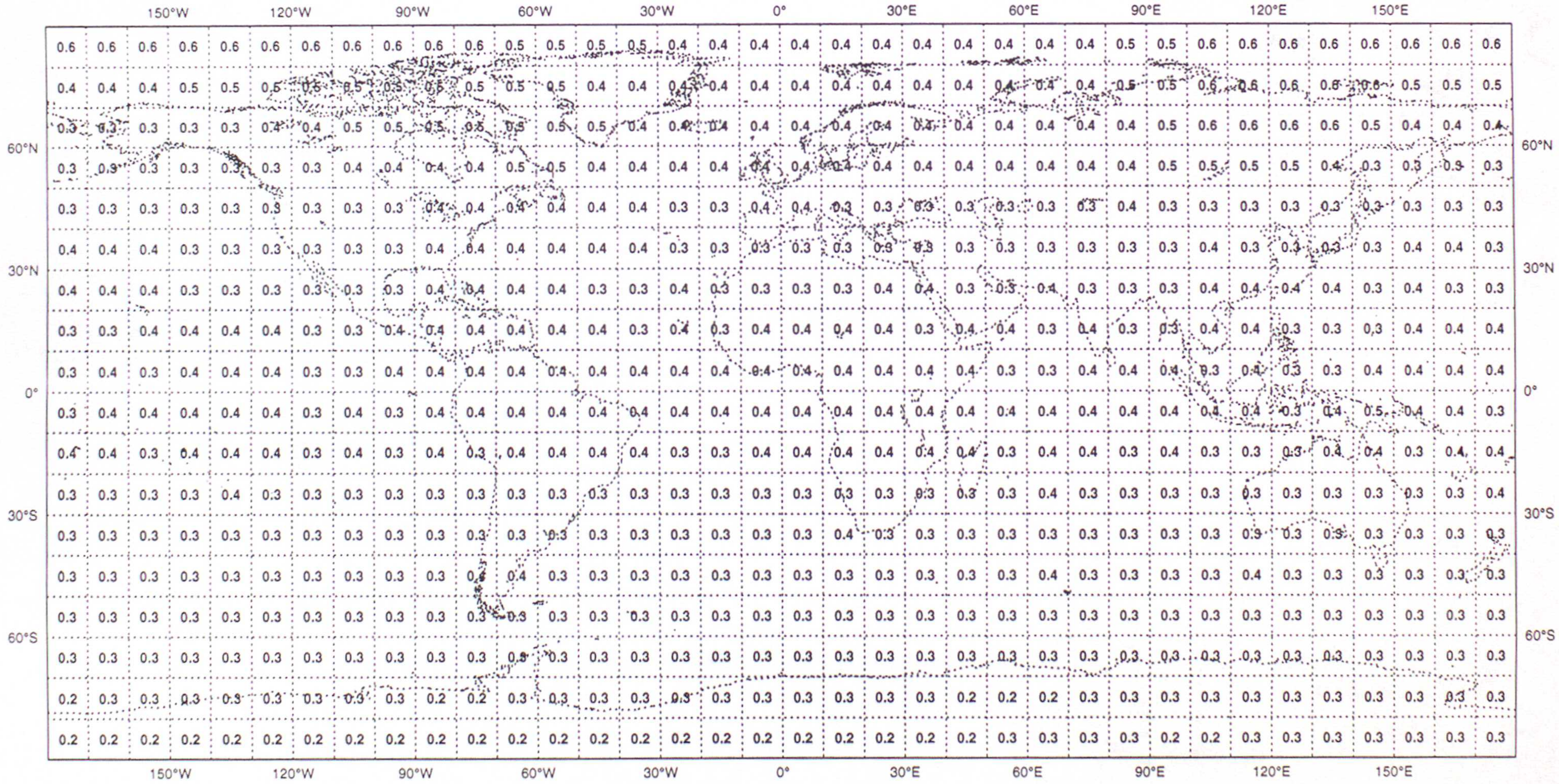

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0.2 0.2 0.2 0.1 0.1 0.1 0.0 0.0 -0.1 -0.1 -0.1 -0.2 -0.2 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.3 -0.2 -0.2 -0.2 -0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.1 0.1 0.2 0.2 0.2 0.2
0.6 0.6 0.5 0.5 0.5 0.4 0.3 0.3 0.2 0.1 0.1 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.0 0.0 0.4 0.1 0.0 0.0 0.1 0.2 0.3 0.4 0.5 0.5 0.6 0.6 0.6
0.9 0.8 0.7 0.7 0.6 0.6 0.5 0.4 0.4 0.3 0.2 0.1 0.0 0.0 0.0 0.1 0.1 0.1 0.2 0.2 0.2 0.2 0.2 0.1 0.1 0.1 0.1 0.3 0.4 0.5 0.6 0.7 0.8 0.9 0.9 0.9
0.9 0.8 0.7 0.6 0.6 0.6 0.5 0.4 0.4 0.4 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.6 0.8 0.9 0.9 0.9 0.8 0.9 0.9
0.8 0.8 0.7 0.5 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.3 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.5 0.6 0.7 0.7 0.6 0.6 0.7 0.8
0.5 0.4 0.4 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.1 0.2 0.2 0.3 0.2 0.2 0.3 0.3 0.4
0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1 0.0 0.1 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.0 0.0 0.1 0.0 0.1 0.1 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0
-0.1 -0.1 -0.2 -0.2 -0.1 0.1 0.1 0.0 0.0 0.0 0.1 0.2 0.1 0.0 -0.1 -0.1 0.0 0.1 0.1 0.1 -0.1 -0.1 -0.1 0.0 0.0 0.1 0.0 0.0 -0.1 0.0 -0.1 -0.1 0.0 -0.1 0.0 -0.1
-0.1 -0.1 -0.2 -0.2 0.0 0.0 0.0 -0.1 0.0 0.0 0.0 0.0 0.0 -0.1 -0.1 -0.2 -0.1 0.0 0.0 -0.1 -0.2 -0.1 0.0 0.0 0.1 0.2 0.1 0.1 0.1 0.1 0.0 0.0 0.2 0.2 0.1 0.0
-0.2 -0.2 -0.2 -0.2 -0.1 0.0 0.0 0.0 0.0 0.0 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 0.0 -0.1 -0.1 -0.3 -0.2 -0.1 0.0 0.0 0.1 0.1 0.1 0.0 0.1 0.0 0.1 0.3 -0.1 0.2 0.1
-0.2 -0.2 -0.1 -0.1 -0.1 0.0 0.1 0.1 0.0 0.0 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 -0.1 0.0 -0.1 -0.1 -0.3 -0.2 -0.2 -0.1 0.0 0.0 0.0 0.0 -0.1 -0.1 -0.2 -0.1 -0.1 -0.1 -0.1 -0.1
0.1 0.1 0.1 0.1 0.1 0.1 0.2 0.1 0.1 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.1 0.1 0.0 -0.1 -0.1 -0.1 0.0 0.0 0.0 0.0 0.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0
0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.3 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.1 0.2 0.2 0.2 0.2 0.2 0.3 0.2 0.2 0.3 0.2 0.3 0.3 0.3
0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.6 0.6 0.7 0.7 0.7 0.7 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.6 0.5 0.6 0.5 0.5 0.5 0.5 0.5 0.5 0.5
0.7 0.7 0.7 0.7 0.7 0.7 0.8 0.8 0.8 0.8 0.8 0.9 0.8 0.8 0.8 0.9 0.8 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.8 0.8 0.8 0.9 0.8 0.8 0.8 0.8 0.8 0.8 0.7
0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.8 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.9 0.8 0.9 0.9 0.8 0.9 0.9 0.9 1.0 0.9 0.9 0.9 0.9
0.9 0.9 1.0 1.0 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 0.9 0.9 1.0 1.0 1.0 1.0 1.0 1.0 0.9 0.9 0.9 0.9 0.9 0.9 1.0 1.1 1.1 1.1 1.0 1.0 0.9 0.9 0.9
1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.2 1.3 1.3 1.3 1.3 1.2 1.2 1.2 1.2

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). JANUARY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.6 0.6 0.6 0.6 0.6 0.6 0.6 0.6
0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.6 0.6 0.6 0.6 0.6 0.5 0.5 0.5
0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.6 0.6 0.6 0.6 0.5 0.4 0.4 0.4
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.5 0.5 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.5 0.5 0.5 0.5 0.4 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.3
0.4 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.4 0.3 0.3 0.3 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.3
0.3 0.3 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.3 0.4 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.4 0.4 0.4
0.3 0.4 0.3 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.4 0.3 0.4 0.3 0.3 0.4 0.4 0.4 0.4
0.3 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.5 0.4 0.4 0.3
0.4 0.4 0.3 0.4 0.4 0.4 0.3 0.4 0.3 0.4 0.3 0.4 0.4 0.4 0.4 0.3 0.3 0.4 0.4 0.4 0.4 0.4 0.4 0.3 0.4 0.4 0.3 0.4 0.3 0.3 0.3 0.4 0.4 0.3 0.4 0.4
0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.4 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.4 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3 0.3
0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.3 0.3 0.3 0.3 0.2 0.2 0.3 0.3 0.3 0.3 0.3 0.3 0.3

## TABLE 8

## MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
## DATA TYPE:- DRIFTER
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

**Period** :One calendar month.

**Data monitored** :Reports from each unique identifier for drifting buoy.

**Area monitored** :10°N - 80°N, 85°W - 0°W

**Standard of comparison** :Background field from UKMO global model.

**Position** :Average latitude and longitude for period.

**Observation times** :All hours combined.

**Elements monitored** :Mean sea-level pressure (hPa)
:Wind speed (m $s^{-1}$)
:Wind direction (degrees)

**Parameters monitored**

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
**N.B. A positive bias indicates the wind observation is veered to the background**

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

**GROSS ERROR LIMITS** :15 hPa (pressure)
:25 m $s^{-1}$ (Vector Wind)

**N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m $s^{-1}$**

| IDENTIFIER | LAT. | LONG. | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| 41503 | 15.3 | -55.6 | P | 547 | 0 | 0 | 0.6 | -1.2 | 1.3 |
| 41522 | 19.6 | -53.4 | P | 604 | 0 | 0 | 0.6 | -0.6 | 0.8 |
| 41531 | 26.5 | -67.8 | P | 617 | 0 | 0 | 0.6 | 0.2 | 0.6 |
| 41532 | 22.9 | -70.1 | P | 656 | 0 | 5 | 0.6 | 0.2 | 0.7 |
| 41533 | 32.6 | -75.0 | P | 594 | 0 | 1 | 0.9 | -1.7 | 2.0 |
| 41534 | 24.4 | -66.3 | P | 636 | 0 | 0 | 0.6 | 0.1 | 0.6 |
| 41537 | 26.6 | -68.6 | P | 749 | 0 | 19 | 0.6 | 0.3 | 0.6 |
| 41577 | 34.8 | -76.4 | P | 604 | 0 | 4 | 0.8 | -0.6 | 1.0 |
| 41640 | 39.8 | -33.3 | P | 647 | 0 | 100 | 0.7 | 2.4 | 2.6 |
| 41648 | 24.9 | -74.6 | P | 621 | 0 | 0 | 0.6 | -0.5 | 0.8 |
| 41649 | 15.8 | -58.0 | P | 575 | 0 | 0 | 0.6 | -1.7 | 1.8 |
| 41650 | 29.9 | -63.9 | P | 53 | 0 | 21 | 0.7 | 0.3 | 0.8 |
| 41652 | 29.4 | -64.5 | P | 177 | 0 | 0 | 0.8 | -0.2 | 0.8 |
| 41658 | 41.6 | -39.6 | P | 615 | 1 | 4 | 1.9 | -0.4 | 1.9 |
| 41659 | 32.1 | -26.2 | P | 639 | 0 | 0 | 0.6 | 0.5 | 0.8 |
| 41666 | 35.2 | -52.6 | P | 962 | 0 | 34 | 0.8 | -0.1 | 0.8 |
| 44549 | 59.8 | -19.1 | P | 1213 | 0 | 46 | 1.1 | -0.8 | 1.4 |
| 44550 | 59.7 | -14.6 | P | 1309 | 0 | 46 | 1.2 | -0.3 | 1.3 |
| 44585 | 43.8 | -67.6 | P | 206 | 0 | 13 | 1.4 | 0.1 | 1.4 |
| 44601 | 32.7 | -41.2 | P | 629 | 0 | 1 | 0.7 | -0.3 | 0.8 |
| 44606 | 30.1 | -52.3 | P | 720 | 0 | 1 | 1.1 | 0.2 | 1.1 |
| 44607 | 39.7 | -44.5 | P | 248 | 1 | 4 | 1.8 | 0.4 | 1.8 |
| 44608 | 37.0 | -37.1 | P | 712 | 0 | 1 | 0.9 | 0.6 | 1.1 |
| 44609 | 51.8 | -24.3 | P | 684 | 0 | 1 | 1.2 | -0.4 | 1.2 |
| 44610 | 41.8 | -45.5 | P | 1077 | 0 | 35 | 1.7 | 0.2 | 1.8 |
| 44611 | 50.1 | -39.6 | P | 1216 | 0 | 41 | 1.2 | -0.2 | 1.2 |
| 44612 | 51.2 | -45.0 | P | 703 | 0 | 4 | 1.8 | 0.5 | 1.8 |
| 44613 | 52.2 | -43.4 | P | 700 | 1 | 5 | 2.0 | 0.2 | 2.0 |
| 44614 | 58.3 | -39.2 | P | 786 | 0 | 16 | 2.0 | 0.4 | 2.0 |
| 44616 | 40.9 | -11.6 | P | 707 | 0 | 2 | 0.7 | -0.5 | 0.9 |
| 44627 | 36.2 | -15.4 | P | 645 | 0 | 0 | 0.7 | -0.7 | 1.0 |
| 44721 | 32.1 | -40.9 | P | 721 | 0 | 0 | 0.7 | -0.2 | 0.7 |
| 44723 | 43.5 | -17.0 | P | 1125 | 0 | 39 | 1.2 | 0.5 | 1.3 |
| 44726 | 60.8 | -36.3 | P | 1422 | 0 | 49 | 1.2 | 0.3 | 1.2 |
| 44730 | 51.6 | -44.0 | P | 606 | 0 | 51 | 1.8 | -0.7 | 1.9 |
| 44763 | 42.0 | -11.4 | P | 1121 | 0 | 38 | 0.7 | 0.2 | 0.8 |
| 44764 | 55.4 | -23.0 | P | 1317 | 1 | 48 | 1.6 | 0.3 | 1.7 |
| 44767 | 52.3 | -19.0 | P | 1048 | 0 | 36 | 0.8 | 0.2 | 0.9 |
| 44768 | 44.0 | -40.3 | P | 652 | 0 | 23 | 2.1 | 2.3 | 3.1 |
| 44769 | 59.8 | -34.7 | P | 1360 | 1 | 51 | 1.3 | -0.8 | 1.5 |
| 44773 | 43.1 | -23.6 | P | 676 | 0 | 2 | 1.2 | 0.6 | 1.3 |
| 44774 | 43.9 | -31.2 | P | 287 | 0 | 15 | 0.9 | -0.1 | 0.9 |
| 44776 | 44.9 | -38.6 | P | 237 | 0 | 53 | 1.9 | -0.3 | 1.9 |
| 44780 | 62.4 | -28.7 | P | 612 | 0 | 42 | 0.9 | -0.2 | 0.9 |
| 47554 | 73.1 | -76.3 | P | 568 | 0 | 32 | 0.8 | 0.1 | 0.8 |
| 48589 | 79.2 | -10.9 | P | 95 | 0 | 1 | 0.9 | -0.4 | 1.0 |
| 62501 | 29.3 | -36.5 | P | 703 | 0 | 0 | 0.6 | 0.5 | 0.8 |
| 62503 | 29.6 | -39.6 | P | 727 | 0 | 0 | 0.6 | -0.9 | 1.1 |
| 62505 | 55.6 | -27.2 | P | 1308 | 0 | 45 | 1.2 | -0.2 | 1.2 |
| 62507 | 54.4 | -10.5 | P | 1153 | 0 | 42 | 0.8 | -0.4 | 0.9 |
| 62508 | 45.3 | -7.9 | P | 705 | 0 | 0 | 0.7 | -0.3 | 0.8 |
| 62509 | 58.1 | -8.5 | P | 631 | 0 | 3 | 1.5 | 0.3 | 1.5 |
| 62512 | 39.4 | -9.9 | P | 1034 | 0 | 37 | 1.2 | 0.5 | 1.3 |
| 62513 | 36.2 | -29.1 | P | 702 | 0 | 0 | 0.8 | 0.6 | 1.0 |
| 62514 | 34.6 | -26.5 | P | 743 | 0 | 7 | 0.9 | 0.1 | 0.9 |
| 62515 | 31.0 | -22.2 | P | 724 | 0 | 0 | 0.6 | 0.1 | 0.6 |
| 62517 | 33.7 | -27.0 | P | 746 | 0 | 6 | 1.0 | -0.1 | 1.0 |
| 62519 | 45.3 | -3.3 | P | 660 | 0 | 2 | 1.2 | 0.2 | 1.2 |
| 62599 | 48.2 | -27.1 | P | 325 | 0 | 14 | 0.9 | 0.0 | 0.9 |
| 62600 | 46.4 | -27.4 | P | 286 | 0 | 18 | 1.0 | -0.1 | 1.0 |

| IDENTIFIER | LAT. | LONG. | ELEM | NOBS | PGE | %REJ | SD | BIAS | RMS |
|---|---|---|---|---|---|---|---|---|---|
| MEAN SEA LEVEL PRESSURE | | | | | | | | | |
| 62696 | 59.1 | -24.6 | P | 1291 | 0 | 46 | 2.0 | 0.1 | 2.0 |
| 62711 | 60.7 | -51.1 | P | 1263 | 0 | 47 | 1.6 | 0.3 | 1.6 |
| 62712 | 61.7 | -37.2 | P | 1419 | 0 | 50 | 1.4 | 0.2 | 1.4 |
| 62713 | 52.6 | -22.0 | P | 550 | 1 | 3 | 1.5 | 0.7 | 1.7 |
| 64553 | 64.6 | -33.1 | P | 540 | 10 | 59 | 3.9 | -0.7 | 4.0 |
| WIND SPEED | | | | | | | | | |
| 41503 | 15.3 | -55.6 | SPEED | 545 | 0 | 100 | 1.3 | -0.5 | 1.4 |
| 41522 | 19.6 | -53.4 | SPEED | 603 | 0 | 100 | 1.7 | 0.2 | 1.7 |
| 41531 | 26.5 | -67.8 | SPEED | 613 | 0 | 100 | 2.2 | 0.2 | 2.2 |
| 41532 | 22.9 | -70.1 | SPEED | 653 | 0 | 100 | 1.8 | 0.0 | 1.8 |
| 41533 | 32.6 | -75.0 | SPEED | 587 | 1 | 100 | 2.7 | 1.6 | 3.1 |
| 41534 | 24.4 | -66.3 | SPEED | 633 | 0 | 100 | 1.9 | 0.0 | 1.9 |
| 41537 | 26.6 | -68.6 | SPEED | 746 | 0 | 100 | 1.8 | -0.1 | 1.8 |
| 41648 | 24.9 | -74.6 | SPEED | 615 | 0 | 100 | 2.5 | 2.1 | 3.3 |
| 41649 | 15.8 | -58.0 | SPEED | 572 | 0 | 100 | 1.2 | 0.0 | 1.2 |
| 44585 | 43.8 | -67.6 | SPEED | 14 | 14 | 100 | 5.0 | 9.4 | 10.6 |
| 44601 | 32.7 | -41.2 | SPEED | 625 | 0 | 100 | 2.5 | -1.6 | 2.9 |
| 44602 | 47.3 | -35.3 | SPEED | 730 | 3 | 100 | 3.9 | 0.7 | 3.9 |
| 62711 | 60.7 | -51.1 | SPEED | 1256 | 0 | 100 | 3.4 | 1.6 | 3.7 |
| WIND DIRECTION | | | | | | | | | |
| 41503 | 15.3 | -55.6 | DIRN. | 488 | 0 | 0 | 12.8 | 2.3 | 13.0 |
| 41522 | 19.6 | -53.4 | DIRN. | 431 | 0 | 0 | 20.6 | 0.5 | 20.6 |
| 41531 | 26.5 | -67.8 | DIRN. | 371 | 1 | 0 | 19.2 | 8.0 | 20.8 |
| 41532 | 22.9 | -70.1 | DIRN. | 334 | 1 | 0 | 20.3 | 12.3 | 23.8 |
| 41533 | 32.6 | -75.0 | DIRN. | 471 | 1 | 0 | 12.7 | -6.5 | 14.3 |
| 41534 | 24.4 | -66.3 | DIRN. | 322 | 1 | 0 | 23.7 | 9.1 | 25.4 |
| 41537 | 26.6 | -68.6 | DIRN. | 458 | 0 | 0 | 24.6 | -12.6 | 27.7 |
| 41648 | 24.9 | -74.6 | DIRN. | 352 | 1 | 0 | 28.8 | 52.6 | 60.0 |
| 41649 | 15.8 | -58.0 | DIRN. | 523 | 0 | 0 | 13.5 | -12.5 | 18.4 |
| 44585 | 43.8 | -67.6 | DIRN. | 12 | 17 | 0 | 59.5 | 41.1 | 72.3 |
| 44601 | 32.7 | -41.2 | DIRN. | 386 | 0 | 0 | 21.6 | 4.1 | 22.0 |
| 44602 | 47.3 | -35.3 | DIRN. | 636 | 3 | 0 | 40.4 | 6.7 | 41.0 |
| 62711 | 60.7 | -51.1 | DIRN. | 1072 | 0 | 0 | 28.0 | 0.9 | 28.0 |

## TABLE 9

## MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures:**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Statistics for each airline carrier. |
| **Area monitored** | | :40°N - 70°N, 60°W - 0°W. |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Observation times** | | :All hours combined. |
| **Level(s) monitored** | | :300.0 - 150.0 hPa |
| **Elements monitored** | | :TEMP in °C ; WIND in m $s^{-1}$ |
| **Parameters monitored** | :N REP. | :Number of observations received excluding duplicates. |
| | :PG | :Percentage of observations with gross errors. |
| | :PR | :Percentage of observations rejected by quality control including rejections from the duplicate check. |
| | :PC | :Percentage of observations with calm winds. |
| | :RMS | :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind. |
| | :BIAS | :Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind. |
| **GROSS ERROR LIMITS** | :10.0 °C ; 60 m $s^{-1}$ Vector Wind | |
| **SELECTION CRITERIA** | :N REP ≥ 20 | |

**NB :** All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

| | TEMPERATURE | | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| AAL | 462 | 2 | 7 | 1.9 | 0.0 | 365 | 1 | 8 | 0 | 10.0 | 0.2 |
| AAR | 21 | 0 | 5 | 2.6 | 0.4 | 21 | 0 | 0 | 0 | 5.5 | -1.2 |
| ACA | 1203 | 0 | 3 | 1.8 | -0.4 | 1174 | 0 | 3 | 0 | 7.5 | 0.6 |
| AEA | 173 | 1 | 7 | 1.9 | 0.5 | 55 | 0 | 2 | 0 | 7.4 | 0.7 |
| AEL | 556 | 0 | 12 | 1.9 | -0.1 | 462 | 0 | 14 | 0 | 8.4 | 0.9 |
| AFL | 313 | 1 | 4 | 1.6 | 0.3 | 299 | 0 | 2 | 0 | 6.8 | 0.8 |
| AFR | 943 | 1 | 9 | 1.6 | 0.0 | 786 | 1 | 11 | 0 | 7.4 | 0.6 |
| AIS | 221 | 1 | 14 | 2.0 | -0.5 | 185 | 1 | 18 | 0 | 9.0 | -0.6 |
| AJM | 235 | 0 | 2 | 1.7 | -0.3 | 192 | 0 | 3 | 0 | 7.6 | -0.2 |
| AMM | 62 | 2 | 10 | 1.8 | -0.1 | 49 | 2 | 8 | 0 | 6.4 | 0.3 |
| AMX | 196 | 1 | 3 | 2.0 | 0.0 | 152 | 0 | 68 | 0 | 12.4 | 1.1 |
| AUA | 38 | 0 | 8 | 1.3 | -0.7 | 35 | 0 | 11 | 0 | 6.7 | -0.2 |
| AZA | 352 | 1 | 8 | 2.2 | 0.0 | 319 | 1 | 8 | 0 | 8.5 | 0.4 |
| BAL | 92 | 0 | 13 | 1.3 | 0.1 | 80 | 0 | 16 | 0 | 12.3 | 0.1 |
| BAW | 561 | 1 | 9 | 1.9 | -0.6 | 558 | 0 | 9 | 0 | 8.6 | 0.1 |
| BPA | 37 | 5 | 65 | 6.1 | 4.3 | 35 | 0 | 14 | 0 | 8.1 | -0.6 |
| BSK | 52 | 0 | 8 | 2.3 | 0.1 | 50 | 0 | 26 | 0 | 17.2 | 0.3 |
| BWA | 73 | 0 | 3 | 1.6 | 0.1 | 50 | 0 | 4 | 0 | 5.9 | 1.5 |
| CFG | 447 | 0 | 4 | 1.7 | -0.8 | 363 | 0 | 6 | 0 | 8.6 | -0.2 |
| CGA | 118 | 0 | 2 | 1.4 | -0.2 | 112 | 0 | 2 | 0 | 6.1 | 1.7 |
| CGF | 45 | 0 | 0 | 1.7 | -0.7 | 44 | 0 | 0 | 0 | 4.8 | 0.7 |
| CGH | 148 | 0 | 2 | 1.5 | -0.3 | 138 | 0 | 2 | 0 | 5.1 | 0.6 |
| CKS | 23 | 0 | 4 | 1.8 | -0.4 | 22 | 0 | 0 | 0 | 8.3 | 0.5 |
| CLX | 216 | 1 | 3 | 1.8 | -0.2 | 210 | 0 | 3 | 0 | 6.6 | 0.3 |
| COA | 143 | 0 | 27 | 1.6 | -0.3 | 88 | 0 | 31 | 0 | 11.0 | 0.8 |
| CRL | 290 | 1 | 4 | 1.6 | 0.2 | 212 | 0 | 6 | 0 | 8.6 | 0.6 |
| CUB | 123 | 4 | 20 | 3.3 | 1.0 | 94 | 0 | 6 | 0 | 8.3 | 0.0 |
| DAB | 287 | 0 | 3 | 1.5 | -0.3 | 271 | 0 | 2 | 0 | 5.6 | 1.1 |
| DAI | 226 | 0 | 2 | 1.4 | 0.2 | 220 | 0 | 2 | 0 | 5.1 | 1.2 |
| DAL | 827 | 0 | 13 | 1.6 | -0.6 | 762 | 0 | 16 | 0 | 8.0 | 0.7 |
| DBR | 52 | 4 | 8 | 1.9 | -0.7 | 50 | 0 | 2 | 0 | 6.6 | 0.4 |
| DCE | 92 | 0 | 11 | 1.9 | -0.1 | 87 | 0 | 14 | 0 | 8.2 | 0.5 |
| DCS | 24 | 0 | 8 | 1.7 | -0.6 | 24 | 0 | 8 | 0 | 4.2 | -0.6 |
| DHL | 64 | 2 | 100 | 6.6 | -6.2 | 62 | 0 | 100 | 0 | 16.2 | 7.1 |
| DLH | 636 | 0 | 8 | 1.4 | -0.1 | 616 | 0 | 9 | 0 | 7.7 | 1.0 |
| EDW | 60 | 0 | 5 | 1.4 | -0.2 | 47 | 4 | 11 | 0 | 9.9 | 1.1 |
| EEZ | 25 | 0 | 12 | 1.2 | -0.2 | 26 | 0 | 15 | 0 | 6.4 | 0.3 |
| EIA | 276 | 2 | 100 | 3.0 | 1.0 | 263 | 1 | 100 | 0 | 19.8 | 5.3 |
| ELY | 117 | 0 | 0 | 1.7 | -0.1 | 113 | 0 | 3 | 0 | 8.6 | 1.2 |
| ETH | 22 | 0 | 5 | 1.4 | 0.4 | 22 | 0 | 9 | 0 | 7.3 | 2.5 |
| FDX | 643 | 0 | 34 | 1.4 | 0.1 | 645 | 1 | 34 | 0 | 7.9 | 0.4 |
| FGS | 254 | 0 | 1 | 1.6 | 0.2 | 247 | 0 | 1 | 0 | 5.2 | 1.2 |
| FGZ | 108 | 0 | 1 | 1.4 | -0.2 | 105 | 0 | 1 | 0 | 4.9 | 0.9 |
| FIN | 213 | 0 | 5 | 1.5 | 0.1 | 205 | 0 | 5 | 0 | 7.3 | 0.0 |
| GCO | 229 | 0 | 3 | 1.7 | -0.2 | 229 | 0 | 5 | 0 | 9.3 | 0.6 |
| GOJ | 22 | 0 | 0 | 1.0 | -0.5 | 22 | 0 | 0 | 0 | 5.1 | 0.9 |
| GRL | 91 | 0 | 0 | 1.2 | -0.2 | 90 | 0 | 1 | 0 | 6.1 | 1.1 |
| GTI | 274 | 0 | 12 | 2.0 | 0.2 | 280 | 0 | 13 | 0 | 8.8 | -0.4 |
| GVA | 42 | 0 | 5 | 1.4 | 0.4 | 41 | 0 | 2 | 0 | 4.8 | -0.4 |
| GVB | 38 | 0 | 0 | 1.5 | 0.4 | 36 | 0 | 0 | 0 | 4.9 | 0.8 |
| GVF | 40 | 0 | 0 | 1.5 | -0.5 | 36 | 0 | 0 | 0 | 5.2 | 1.4 |
| GVG | 51 | 0 | 4 | 1.2 | -0.4 | 49 | 0 | 2 | 0 | 5.3 | 1.1 |
| GVH | 42 | 0 | 0 | 1.2 | -0.1 | 41 | 0 | 0 | 0 | 5.7 | 0.1 |
| GVL | 28 | 0 | 0 | 1.3 | -0.1 | 28 | 0 | 0 | 0 | 6.0 | -0.5 |
| GVR | 114 | 0 | 1 | 1.5 | -0.4 | 111 | 0 | 3 | 0 | 6.2 | 1.1 |
| GVW | 27 | 0 | 4 | 1.6 | -0.8 | 24 | 0 | 8 | 0 | 5.6 | 1.1 |
| GVX | 27 | 0 | 0 | 1.5 | -0.1 | 25 | 0 | 0 | 0 | 5.0 | 1.0 |
| GWW | 64 | 0 | 0 | 1.4 | -0.3 | 61 | 0 | 0 | 0 | 4.3 | 0.2 |
| HZA | 22 | 0 | 5 | 1.0 | 0.2 | 22 | 0 | 5 | 0 | 6.3 | -0.1 |

| | TEMPERATURE | | | | | WIND | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| IDENT. | N.REP. | PG | PR | RMS | BIAS | N.REP. | PG | PR | PC | RMS | BIAS |
| IBE | 952 | 1 | 5 | 1.7 | 0.3 | 539 | 0 | 7 | 0 | 8.6 | 0.0 |
| ICE | 590 | 0 | 2 | 1.5 | -0.1 | 578 | 0 | 2 | 0 | 7.0 | 0.5 |
| IWD | 54 | 0 | 4 | 1.5 | -0.2 | 22 | 0 | 9 | 0 | 6.6 | 0.7 |
| JMC | 32 | 0 | 3 | 1.3 | 0.5 | 27 | 0 | 7 | 0 | 11.0 | -0.7 |
| KLM | 1254 | 0 | 4 | 1.7 | -0.2 | 1105 | 0 | 4 | 0 | 7.8 | 0.5 |
| LAN | 27 | 0 | 15 | 3.0 | -0.6 | 26 | 0 | 15 | 0 | 9.5 | 0.2 |
| LDI | 315 | 1 | 6 | 1.8 | -0.6 | 234 | 1 | 6 | 0 | 8.2 | -0.7 |
| LIB | 227 | 0 | 6 | 1.7 | 1.0 | 147 | 1 | 10 | 0 | 6.8 | -0.1 |
| LOT | 82 | 0 | 0 | 2.0 | -1.4 | 81 | 0 | 1 | 0 | 8.1 | 0.3 |
| LTU | 388 | 1 | 5 | 1.5 | 0.1 | 335 | 1 | 6 | 0 | 7.0 | 0.5 |
| MAS | 23 | 0 | 0 | 1.2 | -0.1 | 21 | 0 | 5 | 0 | 6.7 | 0.8 |
| MON | 65 | 3 | 8 | 1.6 | -0.2 | 55 | 0 | 9 | 0 | 9.6 | 0.2 |
| MPD | 124 | 1 | 7 | 2.3 | 1.1 | 59 | 0 | 8 | 0 | 10.0 | 1.0 |
| MPH | 324 | 0 | 3 | 1.8 | -0.8 | 304 | 0 | 4 | 0 | 8.8 | 0.5 |
| MYT | 157 | 1 | 4 | 1.8 | -0.2 | 137 | 0 | 4 | 0 | 6.1 | 0.6 |
| NCA | 26 | 0 | 0 | 1.2 | 0.6 | 24 | 0 | 0 | 0 | 4.8 | 0.6 |
| NWA | 2888 | 0 | 4 | 1.7 | 0.2 | 2884 | 0 | 4 | 0 | 7.1 | 0.5 |
| OAE | 89 | 0 | 9 | 1.5 | -0.1 | 90 | 0 | 47 | 0 | 19.6 | 7.8 |
| PAC | 265 | 2 | 7 | 1.7 | 0.0 | 265 | 0 | 6 | 0 | 8.3 | -0.4 |
| RAM | 211 | 0 | 2 | 1.6 | 0.0 | 120 | 1 | 100 | 0 | 7.8 | 0.5 |
| RCH | 246 | 2 | 100 | 2.6 | 0.2 | 189 | 0 | 100 | 0 | 11.8 | 2.0 |
| RRR | 50 | 14 | 16 | 2.1 | -0.6 | 48 | 2 | 8 | 0 | 7.1 | 1.0 |
| RZO | 45 | 0 | 7 | 2.3 | 0.0 | 31 | 3 | 6 | 0 | 7.4 | 0.8 |
| SEU | 89 | 3 | 7 | 2.1 | 0.1 | 78 | 0 | 5 | 0 | 8.5 | 1.0 |
| SLR | 131 | 2 | 15 | 1.5 | -0.4 | 117 | 1 | 15 | 0 | 9.1 | 0.0 |
| SVA | 28 | 0 | 7 | 1.7 | 0.1 | 28 | 0 | 4 | 0 | 4.9 | -0.1 |
| TAP | 252 | 0 | 4 | 1.5 | -0.5 | 128 | 0 | 7 | 0 | 8.5 | 0.8 |
| TSC | 46 | 0 | 2 | 1.4 | -0.1 | 36 | 0 | 0 | 0 | 6.3 | 1.7 |
| UAL | 595 | 1 | 64 | 2.2 | -1.3 | 590 | 0 | 66 | 0 | 8.4 | 0.5 |
| UPS | 961 | 0 | 46 | 2.2 | 0.5 | 934 | 0 | 45 | 0 | 8.7 | 0.4 |
| USA | 234 | 2 | 5 | 1.9 | 0.1 | 194 | 1 | 6 | 0 | 9.3 | 0.1 |
| VIR | 208 | 0 | 2 | 1.7 | -0.3 | 216 | 1 | 4 | 0 | 8.4 | 0.8 |
| WOA | 385 | 0 | 12 | 1.8 | 0.1 | 376 | 0 | 17 | 0 | 10.9 | 1.9 |
| 9VS | 178 | 0 | 4 | 1.5 | -0.3 | 174 | 0 | 4 | 0 | 5.0 | 0.8 |
| EU | 25176 | 0 | 19 | 1.3 | -0.1 | 25176 | 0 | 20 | 0 | 5.3 | 0.6 |
| KL | 1318 | 0 | 9 | 1.2 | 0.6 | 1313 | 0 | 9 | 0 | 5.6 | 0.8 |
| LH | 551 | 0 | 9 | 1.7 | 1.2 | 551 | 0 | 9 | 0 | 5.3 | 1.0 |
| TN | 26 | 0 | 8 | 2.2 | 0.6 | 27 | 0 | 11 | 0 | 11.2 | -1.4 |
| N | 2171 | 0 | 16 | 1.6 | 0.1 | 2141 | 0 | 15 | 0 | 5.9 | 1.1 |
| US ACARS | 27487 | 7 | 36 | 1.7 | 0.3 | 27487 | 0 | 30 | 0 | 5.9 | 0.6 |

## TABLE 10

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :100 hPa. |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT in metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.1

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | SD | RMS | BIAS |
|---|---|---|---|---|---|---|---|---|
| ELML7 | 00 | Z | 100 | 16 | 0 | 16.3 | 25.6 | 19.8 |
| ELML7 | 12 | Z | 100 | 21 | 0 | 21.1 | 34.9 | 27.8 |
| FNPH | 00 | Z | 100 | 5 | 0 | 26.6 | 32.7 | -19.0 |
| FNPH | 12 | Z | 100 | 2 | 0 | 11.0 | 39.6 | -38.0 |
| FNRS | 00 | Z | 100 | 3 | 0 | 6.7 | 28.1 | -27.3 |
| FNRS | 12 | Z | 100 | 7 | 0 | 9.3 | 10.1 | -3.9 |
| LDWR | 00 | Z | 100 | 30 | 0 | 12.5 | 32.6 | -30.2 |
| LDWR | 12 | Z | 100 | 28 | 0 | 19.2 | 31.7 | -25.3 |
| OVYA2 | 00 | Z | 100 | 3 | 0 | 9.7 | 21.1 | -18.7 |
| OVYA2 | 12 | Z | 100 | 5 | 0 | 11.3 | 23.5 | -20.6 |
| OXTS2 | 00 | Z | 100 | 6 | 1 | 17.9 | 34.4 | -29.3 |
| OXTS2 | 12 | Z | 100 | 7 | 0 | 17.9 | 38.8 | -34.4 |
| SWJS | 00 | Z | 100 | 1 | 0 | 0.0 | 13.0 | 13.0 |
| SWJS | 12 | Z | 100 | 2 | 0 | 7.0 | 20.2 | 19.0 |
| WPKD | 00 | Z | 100 | 4 | 2 | 2.1 | 11.7 | -11.5 |
| WPKD | 12 | Z | 100 | 5 | 0 | 21.8 | 24.2 | 10.4 |
| ZCBP6 | 00 | Z | 100 | 2 | 0 | 14.5 | 32.0 | -28.5 |
| ZCBP6 | 12 | Z | 100 | 4 | 0 | 16.5 | 19.3 | -10.0 |
| 03953 | 00 | Z | 100 | 27 | 1 | 22.4 | 22.6 | -3.1 |
| 03953 | 12 | Z | 100 | 28 | 0 | 22.1 | 23.3 | 7.4 |
| 04018 | 00 | Z | 100 | 30 | 0 | 11.5 | 23.2 | -20.1 |
| 04018 | 12 | Z | 100 | 29 | 0 | 12.9 | 20.3 | -15.7 |
| 04220 | 00 | Z | 100 | 29 | 0 | 10.9 | 24.7 | -22.2 |
| 04220 | 12 | Z | 100 | 25 | 0 | 11.0 | 24.3 | -21.7 |
| 04270 | 00 | Z | 100 | 27 | 0 | 11.2 | 28.5 | -26.2 |
| 04270 | 12 | Z | 100 | 27 | 0 | 15.7 | 29.1 | -24.6 |
| 04339 | 00 | Z | 100 | 28 | 0 | 13.7 | 25.7 | -21.8 |
| 04339 | 12 | Z | 100 | 26 | 0 | 10.5 | 20.3 | -17.4 |
| 04360 | 00 | Z | 100 | 28 | 0 | 13.3 | 30.5 | -27.5 |
| 04360 | 12 | Z | 100 | 27 | 0 | 13.5 | 25.9 | -22.1 |
| 08001 | 00 | Z | 100 | 27 | 0 | 26.0 | 27.6 | -9.3 |
| 08001 | 12 | Z | 100 | 25 | 1 | 19.4 | 20.6 | -6.9 |
| 08508 | 12 | Z | 100 | 27 | 0 | 18.2 | 38.8 | 34.2 |
| 08522 | 12 | Z | 100 | 8 | 0 | 13.5 | 31.1 | 28.0 |
| 08594 | 12 | Z | 100 | 22 | 0 | 11.0 | 14.4 | 9.3 |
| 71600 | 00 | Z | 100 | 29 | 0 | 17.0 | 35.6 | -31.2 |
| 71600 | 12 | Z | 100 | 29 | 0 | 22.8 | 37.6 | -29.9 |
| 72201 | 00 | Z | 100 | 26 | 0 | 16.9 | 17.6 | -5.1 |
| 72201 | 12 | Z | 100 | 27 | 0 | 26.5 | 29.5 | -13.0 |
| 72402 | 00 | Z | 100 | 29 | 0 | 15.4 | 15.4 | 0.7 |
| 72402 | 12 | Z | 100 | 26 | 0 | 15.3 | 16.6 | -6.5 |
| 74494 | 00 | Z | 100 | 25 | 0 | 12.8 | 16.6 | -10.6 |
| 74494 | 12 | Z | 100 | 26 | 0 | 20.8 | 37.7 | -31.5 |
| 78016 | 00 | Z | 100 | 22 | 0 | 12.2 | 31.8 | 29.3 |
| 78016 | 12 | Z | 100 | 26 | 0 | 18.7 | 28.4 | 21.4 |

# TABLE 11

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures:**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :500 hPa. |
| **Element monitored** | | :GEOPOTENTIAL HEIGHT in metres |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :SD | :SD of difference of observations from background values at level shown excluding those with gross errors. |
| | :BIAS | :Mean difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.1

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | SD | RMS | BIAS |
|---|---|---|---|---|---|---|---|---|
| ELML7 | 00 | Z | 500 | 19 | 0 | 7.4 | 7.6 | 1.6 |
| ELML7 | 12 | Z | 500 | 21 | 0 | 10.6 | 10.7 | 1.9 |
| FNPH | 00 | Z | 500 | 6 | 0 | 8.6 | 15.6 | -13.0 |
| FNPH | 12 | Z | 500 | 3 | 0 | 8.1 | 14.7 | -12.3 |
| FNRS | 00 | Z | 500 | 3 | 0 | 4.0 | 15.9 | -15.3 |
| FNRS | 12 | Z | 500 | 7 | 0 | 8.4 | 9.1 | -3.4 |
| LDWR | 00 | Z | 500 | 30 | 0 | 10.8 | 11.4 | -3.6 |
| LDWR | 12 | Z | 500 | 29 | 0 | 12.9 | 13.8 | -4.9 |
| OVYA2 | 00 | Z | 500 | 3 | 0 | 7.1 | 7.4 | 2.0 |
| OVYA2 | 12 | Z | 500 | 5 | 0 | 10.0 | 10.8 | -4.0 |
| OXTS2 | 00 | Z | 500 | 6 | 1 | 5.2 | 15.4 | -14.5 |
| OXTS2 | 12 | Z | 500 | 7 | 0 | 2.4 | 18.0 | -17.9 |
| SWJS | 00 | Z | 500 | 1 | 1 | 0.0 | 4.0 | -4.0 |
| SWJS | 12 | Z | 500 | 2 | 0 | 13.5 | 17.7 | -11.5 |
| WPKD | 00 | Z | 500 | 5 | 2 | 7.3 | 11.3 | -8.6 |
| WPKD | 12 | Z | 500 | 7 | 0 | 7.7 | 7.7 | -0.9 |
| ZCBP6 | 00 | Z | 500 | 3 | 0 | 7.0 | 7.6 | -3.0 |
| ZCBP6 | 12 | Z | 500 | 5 | 0 | 10.7 | 12.4 | -6.4 |
| 03953 | 00 | Z | 500 | 29 | 1 | 9.7 | 9.8 | 0.7 |
| 03953 | 12 | Z | 500 | 30 | 0 | 11.3 | 14.5 | 9.0 |
| 04018 | 00 | Z | 500 | 30 | 0 | 9.5 | 9.6 | -1.5 |
| 04018 | 12 | Z | 500 | 30 | 0 | 9.9 | 9.9 | -0.9 |
| 04220 | 00 | Z | 500 | 29 | 0 | 9.9 | 10.1 | 1.9 |
| 04220 | 12 | Z | 500 | 25 | 0 | 7.4 | 8.1 | -3.2 |
| 04270 | 00 | Z | 500 | 28 | 0 | 9.8 | 10.0 | 2.1 |
| 04270 | 12 | Z | 500 | 27 | 0 | 13.0 | 13.7 | -4.3 |
| 04339 | 00 | Z | 500 | 28 | 0 | 8.1 | 8.2 | -1.5 |
| 04339 | 12 | Z | 500 | 26 | 0 | 8.4 | 8.5 | -1.5 |
| 04360 | 00 | Z | 500 | 28 | 0 | 6.5 | 7.0 | -2.5 |
| 04360 | 12 | Z | 500 | 27 | 0 | 10.2 | 10.7 | -3.3 |
| 08001 | 00 | Z | 500 | 30 | 0 | 12.2 | 15.0 | -8.7 |
| 08001 | 12 | Z | 500 | 28 | 1 | 11.1 | 11.1 | -0.4 |
| 08508 | 12 | Z | 500 | 27 | 0 | 9.9 | 10.0 | -1.1 |
| 08522 | 12 | Z | 500 | 8 | 0 | 9.2 | 9.6 | 2.8 |
| 08594 | 12 | Z | 500 | 25 | 0 | 7.3 | 10.4 | -7.3 |
| 71600 | 00 | Z | 500 | 30 | 0 | 9.9 | 14.3 | -10.2 |
| 71600 | 12 | Z | 500 | 30 | 0 | 9.8 | 13.1 | -8.7 |
| 72201 | 00 | Z | 500 | 28 | 0 | 6.0 | 8.0 | -5.3 |
| 72201 | 12 | Z | 500 | 28 | 0 | 7.3 | 10.5 | -7.6 |
| 72402 | 00 | Z | 500 | 29 | 0 | 7.8 | 7.8 | 0.3 |
| 72402 | 12 | Z | 500 | 26 | 0 | 6.4 | 7.8 | -4.4 |
| 74494 | 00 | Z | 500 | 28 | 0 | 9.2 | 10.5 | -5.0 |
| 74494 | 12 | Z | 500 | 29 | 0 | 8.0 | 10.7 | -7.2 |
| 78016 | 00 | Z | 500 | 27 | 0 | 8.3 | 10.7 | 6.8 |
| 78016 | 12 | Z | 500 | 30 | 0 | 8.4 | 10.1 | 5.6 |

# TABLE 12

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :100 hPa. |
| **Element monitored** | | :VECTOR WIND in m $s^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :UBIAS,VBIAS | :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.2

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | % REJ | RMS | UBIAS | VBIAS |
|---|---|---|---|---|---|---|---|---|---|
| ELML7 | 00 | V | 100 | 14 | 0 | 0 | 5.6 | 0.2 | -1.8 |
| ELML7 | 12 | V | 100 | 16 | 0 | 0 | 5.8 | -0.9 | -1.7 |
| FNPH | 00 | V | 100 | 5 | 0 | 0 | 9.3 | -6.6 | -5.6 |
| FNPH | 12 | V | 100 | 1 | 0 | 0 | 10.0 | -10.0 | -1.1 |
| FNRS | 00 | V | 100 | 3 | 0 | 0 | 4.9 | 0.3 | -0.8 |
| FNRS | 12 | V | 100 | 7 | 0 | 0 | 5.2 | -1.1 | -0.1 |
| LDWR | 00 | V | 100 | 28 | 0 | 0 | 2.9 | 0.9 | -0.5 |
| LDWR | 12 | V | 100 | 28 | 0 | 0 | 3.3 | 0.5 | -0.4 |
| OVYA2 | 00 | V | 100 | 2 | 0 | 0 | 5.5 | 4.7 | 0.7 |
| OVYA2 | 12 | V | 100 | 4 | 0 | 0 | 5.1 | -0.6 | 1.4 |
| OXTS2 | 00 | V | 100 | 7 | 0 | 0 | 3.7 | 1.1 | -0.5 |
| OXTS2 | 12 | V | 100 | 6 | 0 | 0 | 3.6 | -1.1 | -1.6 |
| SWJS | 00 | V | 100 | 1 | 0 | 0 | 7.4 | 3.7 | 6.4 |
| SWJS | 12 | V | 100 | 1 | 0 | 0 | 9.6 | -8.2 | 5.0 |
| WPKD | 00 | V | 100 | 6 | 0 | 0 | 6.9 | 2.9 | -3.0 |
| WPKD | 12 | V | 100 | 5 | 0 | 0 | 3.7 | -0.9 | 1.6 |
| ZCBP6 | 00 | V | 100 | 2 | 0 | 0 | 5.7 | 0.0 | -2.8 |
| ZCBP6 | 12 | V | 100 | 2 | 0 | 0 | 2.7 | -0.3 | -0.1 |
| 03953 | 00 | V | 100 | 27 | 0 | 0 | 3.6 | 0.7 | 0.4 |
| 03953 | 12 | V | 100 | 28 | 0 | 0 | 3.5 | -0.2 | 0.5 |
| 04018 | 00 | V | 100 | 29 | 0 | 0 | 3.8 | 1.1 | -0.2 |
| 04018 | 12 | V | 100 | 28 | 0 | 0 | 3.3 | 0.7 | -0.3 |
| 04220 | 00 | V | 100 | 29 | 0 | 0 | 3.3 | -0.1 | 0.6 |
| 04220 | 12 | V | 100 | 25 | 0 | 0 | 2.5 | 0.0 | -0.2 |
| 04270 | 00 | V | 100 | 25 | 0 | 0 | 3.9 | 0.1 | -0.2 |
| 04270 | 12 | V | 100 | 26 | 0 | 0 | 4.4 | 0.3 | 0.7 |
| 04339 | 00 | V | 100 | 24 | 0 | 0 | 4.5 | 0.6 | -0.9 |
| 04339 | 12 | V | 100 | 26 | 0 | 0 | 4.3 | 1.7 | -0.5 |
| 04360 | 00 | V | 100 | 28 | 0 | 0 | 2.8 | 0.1 | -0.2 |
| 04360 | 12 | V | 100 | 27 | 0 | 0 | 3.0 | -0.5 | 0.1 |
| 08001 | 00 | V | 100 | 26 | 0 | 0 | 5.3 | 1.6 | 1.1 |
| 08001 | 12 | V | 100 | 22 | 0 | 0 | 5.8 | 0.3 | -0.5 |
| 08508 | 12 | V | 100 | 24 | 0 | 0 | 5.8 | 0.6 | 1.4 |
| 08522 | 12 | V | 100 | 8 | 0 | 0 | 4.6 | 2.6 | 0.5 |
| 08594 | 12 | V | 100 | 20 | 0 | 100 | 4.4 | -0.9 | 1.4 |
| 71600 | 00 | V | 100 | 29 | 0 | 0 | 4.0 | 0.5 | 1.2 |
| 71600 | 12 | V | 100 | 29 | 0 | 0 | 4.1 | 1.0 | 0.5 |
| 72201 | 00 | V | 100 | 26 | 0 | 0 | 3.8 | 0.1 | 0.7 |
| 72201 | 12 | V | 100 | 27 | 0 | 0 | 4.7 | -0.5 | 2.0 |
| 72402 | 00 | V | 100 | 29 | 0 | 0 | 5.0 | 1.4 | 1.5 |
| 72402 | 12 | V | 100 | 28 | 0 | 0 | 5.2 | 1.4 | -0.2 |
| 74494 | 00 | V | 100 | 24 | 0 | 29 | 3.6 | -0.7 | 1.3 |
| 74494 | 12 | V | 100 | 25 | 0 | 32 | 5.6 | -1.9 | 2.2 |
| 78016 | 00 | V | 100 | 21 | 0 | 0 | 6.9 | 1.4 | 0.1 |
| 78016 | 12 | V | 100 | 20 | 0 | 5 | 9.1 | 2.5 | -1.4 |

## TABLE 13

## MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
## MONITORING CENTRE: BRACKNELL
## MONTH: January 2003

**Monitoring procedures**

| | | |
|---|---|---|
| **Period** | | :One calendar month. |
| **Data monitored** | | :Reports from selected radiosonde TEMPs. |
| **Area monitored** | | :0°N - 90°N, 100°W - 40°E |
| **Standard of comparison** | | :Background field from UKMO global model. |
| **Position** | | :Average latitude and longitude for period. |
| **Observation times** | | :00, 12 UTC. |
| **Level monitored** | | :500 hPa. |
| **Element monitored** | | :VECTOR WIND in m s$^{-1}$ |
| **Parameters monitored** | :NUM OBS | :Number of observations available at level shown during period. |
| | :NUM GROSS | :Number of gross errors at level shown during period. |
| | :UBIAS,VBIAS: | Mean difference of observations of U and V components from background values at level shown excluding those with gross errors. |
| | :RMS | :Root Mean Square difference of observations from background values at level shown excluding those with gross errors. |

**GROSS ERROR LIMITS** :Defined in Appendix I.2

| WMO IDENT | OBS TIME | ELM | LEV | NUM OBS | NUM GROSS | % REJ | RMS | UBIAS | VBIAS |
|---|---|---|---|---|---|---|---|---|---|
| ELML7 | 00 | V | 500 | 19 | 0 | 0 | 3.1 | 0.1 | 0.4 |
| ELML7 | 12 | V | 500 | 18 | 0 | 0 | 5.0 | -0.4 | 0.8 |
| FNPH | 00 | V | 500 | 6 | 0 | 0 | 11.4 | -8.4 | -6.0 |
| FNPH | 12 | V | 500 | 3 | 0 | 0 | 7.5 | -5.8 | -2.1 |
| FNRS | 00 | V | 500 | 3 | 0 | 0 | 6.6 | 0.5 | 3.4 |
| FNRS | 12 | V | 500 | 7 | 0 | 0 | 5.2 | -1.5 | 0.7 |
| LDWR | 00 | V | 500 | 30 | 0 | 0 | 4.2 | -0.2 | -0.7 |
| LDWR | 12 | V | 500 | 29 | 0 | 0 | 4.4 | 1.6 | 0.1 |
| OVYA2 | 00 | V | 500 | 3 | 0 | 0 | 5.0 | 3.7 | 0.5 |
| OVYA2 | 12 | V | 500 | 3 | 0 | 0 | 3.7 | -2.4 | 0.5 |
| OXTS2 | 00 | V | 500 | 6 | 0 | 0 | 3.8 | 0.1 | -0.7 |
| OXTS2 | 12 | V | 500 | 6 | 0 | 0 | 4.6 | 1.0 | -0.9 |
| SWJS | 00 | V | 500 | 1 | 0 | 0 | 5.8 | 5.8 | -0.5 |
| SWJS | 12 | V | 500 | 2 | 0 | 0 | 4.9 | 4.4 | -0.7 |
| WPKD | 00 | V | 500 | 7 | 0 | 0 | 5.5 | -0.4 | 0.6 |
| WPKD | 12 | V | 500 | 7 | 0 | 0 | 3.0 | 0.5 | 0.2 |
| ZCBP6 | 00 | V | 500 | 2 | 0 | 0 | 4.3 | -2.4 | 0.4 |
| ZCBP6 | 12 | V | 500 | 2 | 0 | 0 | 6.0 | -5.0 | -0.4 |
| 03953 | 00 | V | 500 | 30 | 0 | 0 | 4.2 | 0.5 | -0.3 |
| 03953 | 12 | V | 500 | 30 | 0 | 0 | 5.4 | 0.4 | 0.1 |
| 04018 | 00 | V | 500 | 30 | 0 | 3 | 5.9 | 0.0 | -1.0 |
| 04018 | 12 | V | 500 | 30 | 0 | 0 | 4.3 | -0.3 | -0.4 |
| 04220 | 00 | V | 500 | 29 | 0 | 0 | 3.8 | 0.2 | 0.5 |
| 04220 | 12 | V | 500 | 25 | 0 | 0 | 4.5 | 0.6 | -0.2 |
| 04270 | 00 | V | 500 | 28 | 0 | 0 | 5.1 | -0.2 | 0.2 |
| 04270 | 12 | V | 500 | 27 | 0 | 3 | 7.5 | -1.3 | 0.0 |
| 04339 | 00 | V | 500 | 21 | 0 | 4 | 5.8 | 1.2 | 0.2 |
| 04339 | 12 | V | 500 | 24 | 0 | 0 | 4.3 | 0.8 | 0.6 |
| 04360 | 00 | V | 500 | 28 | 0 | 0 | 4.7 | 0.0 | 0.4 |
| 04360 | 12 | V | 500 | 27 | 0 | 0 | 3.7 | -0.8 | 0.0 |
| 08001 | 00 | V | 500 | 29 | 0 | 0 | 5.8 | 1.1 | 0.8 |
| 08001 | 12 | V | 500 | 29 | 0 | 0 | 4.6 | 0.7 | 0.6 |
| 08508 | 12 | V | 500 | 23 | 0 | 0 | 4.4 | -0.3 | 0.3 |
| 08522 | 12 | V | 500 | 8 | 0 | 0 | 5.6 | 0.1 | -1.1 |
| 08594 | 12 | V | 500 | 25 | 0 | 100 | 4.9 | 0.6 | 0.8 |
| 71600 | 00 | V | 500 | 30 | 0 | 0 | 5.1 | 1.2 | 1.1 |
| 71600 | 12 | V | 500 | 30 | 0 | 0 | 4.8 | 0.4 | 0.5 |
| 72201 | 00 | V | 500 | 28 | 0 | 3 | 4.2 | -0.8 | -0.8 |
| 72201 | 12 | V | 500 | 28 | 0 | 0 | 3.7 | -0.2 | -0.4 |
| 72402 | 00 | V | 500 | 29 | 0 | 0 | 4.0 | 0.9 | -0.3 |
| 72402 | 12 | V | 500 | 29 | 0 | 0 | 3.8 | 0.7 | 0.5 |
| 74494 | 00 | V | 500 | 28 | 0 | 32 | 4.1 | -2.0 | 0.5 |
| 74494 | 12 | V | 500 | 29 | 0 | 34 | 5.3 | -0.9 | 1.1 |
| 78016 | 00 | V | 500 | 27 | 0 | 0 | 4.6 | 1.5 | 2.0 |
| 78016 | 12 | V | 500 | 28 | 0 | 0 | 5.0 | 1.6 | -0.3 |

# APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

| Level (hPa) | Geopotential height (metres) |
|---|---|
| 1000 | 100 |
| 850 | 100 |
| 700 | 100 |
| 500 | 150 |
| 400 | 175 |
| 300 | 200 |
| 250 | 225 |
| 200 | 250 |
| 150 | 275 |
| 100 | 300 |
| 70 | 375 |
| 50 | 400 |
| 30 | 450 |

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

| Level (hPa) | Weight |
|---|---|
| 1000 | 3.70 |
| 850 | 3.40 |
| 700 | 2.90 |
| 500 | 2.20 |
| 400 | 1.90 |
| 300 | 1.60 |
| 250 | 1.50 |
| 200 | 1.37 |
| 150 | 1.19 |
| 100 | 1.00 |
| 70 | 0.87 |
| 50 | 0.80 |
| 30 | 0.64 |

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

| Level (hPa) | Windspeed m $s^{-1}$ |
|---|---|
| 1000 | 35 |
| 850 | 35 |
| 700 | 40 |
| 500 | 45 |
| 400 | 50 |
| 300 | 60 |
| 250 | 60 |
| 200 | 50 |
| 150 | 50 |
| 100 | 45 |